

Fig. 1.

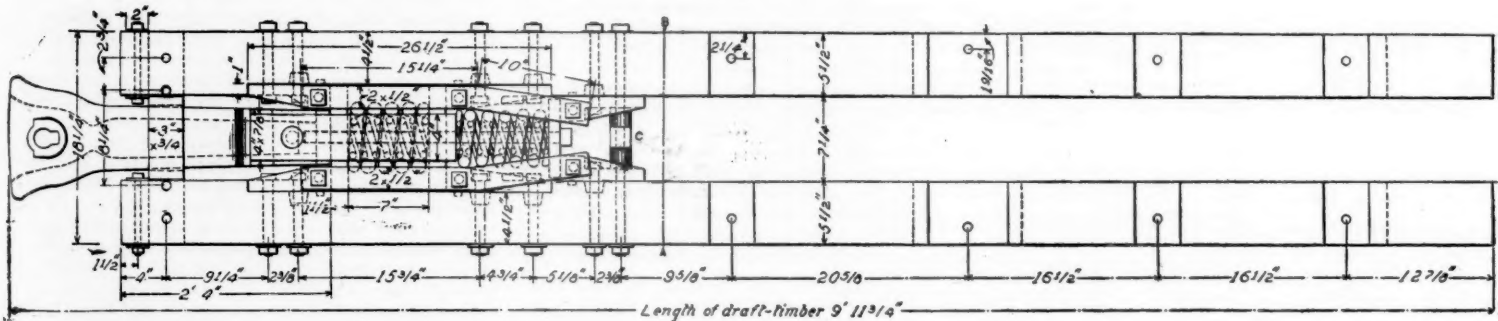


Fig. 2.

NEW DRAFT RIGGING OF THE CHICAGO & NORTHWESTERN RAILWAY.

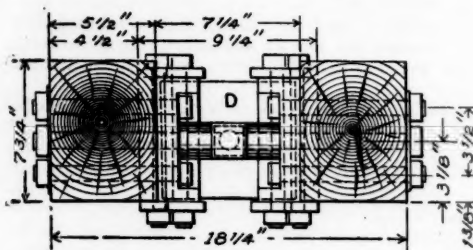


Fig. 3.

little manual labor on the part of the attendant. A simpler device for this purpose it would be difficult to conceive.

It has been found necessary in these shops, as in most wheel shops, to pay considerable attention to the exact centering of truck wheels; and in order to determine the condition of the chucks on the boring mill, the attendant is required to examine his chucks once each day, before commencing work, to see if they will exactly centre a wheel. It has been found that the ordinary three-jawed chuck is liable to be inaccurate unless carefully watched. Recently a set of roller bearings of simple construction was placed on one of the transfer tables, resulting in such a large reduction in friction that two men can now do the work of ten in moving the table. From an inspection of these shops it is evident that every effort is being made to bring them up to the best practice of the day.

New Draft Rigging of the Chicago & Northwestern.

The continual increase in the repairs necessary for the maintenance in good order of the draft rigging of freight cars has given rise to several different and new designs of draft rigging. The one shown herewith is designed by Mr. C. A. Schroyer, Car Superintendent of the Chicago & Northwestern, to meet the demands of the service to which cars are subjected when handled with the heavy switching engines and by careless trainmen. Our readers will remember that the *Railroad Gazette* illustrated the draft timbers used on this road in the issue of Feb. 1, 1889.

In the new design two draft springs are used: one of 18,000 lbs. and another of 9,000 lbs. capacity. When the draw bar is driven in both springs are actuated, but when drawn out, only one, which is the larger one. Fig. 1 represents a sectional elevation through the centre of the draw gear. Fig. 2 a plan of the same. Fig. 3 a section through the line A B looking toward the nearest end of the car. It will be noticed that, as shown in fig. 1, the strap on the end of the draw bar, the draft spring and the follower plates are quite the same as those formerly used by this company. In this new device the 2-in. x 1-in. wrought-iron straps which connect the stop blocks are extended backward and bent inward to receive two additional stop blocks placed between the draft timbers at the back of the auxiliary spring. These stop blocks are precisely the same as those used in the front part of the gear, and are secured in a similar way. Between them laterally is placed a thimble, as shown at D, fig. 2, and D, fig. 3, through which and the two draft timbers passes a long bolt binding all parts together.

A New Smoke Box and Exhaust Pipe Design.

While the subject of exhaust pipes and nozzles is being so thoroughly discussed in the United States, it may not be out of place to call attention to the fact that the difficulties met here are not unknown in other countries. The illustration herewith shows how the Northern Railroad of France is endeavoring to produce an exhaust which may be made variable at will.

It will be noticed that the base of the smokestack is extended downward in the form of a petticoat pipe to a

point just below the top of the exhaust nozzle, and at that point the base of the stack is covered with a grating made of small steel rods placed sufficiently close to break up all large clinders that are drawn through the tubes. The blowing of the fire when the locomotive is standing still is accomplished by admitting dry steam from the dome, by means of a valve with a lever, observable on the side of the dome, and a copper pipe leading forward therefrom through the side of the smoke box to a ring around the top of the exhaust nozzle. On the top of the stack is a rotating lid, which is carried on a vertical shaft on the back side of the stack, as shown. The object of this lid is to hold the smoke within the stack and smoke box while the locomotive is passing through covered stations.

The variable exhaust is secured by diverting the jet of the exhaust, up a copper pipe of oval section, to the top of the stack. This is brought about by changing the position of a flap valve, which is fastened to a shaft passing through the exhaust pipe at the entrance to the auxiliary passage, as represented in the cut. The valve is of brass and it moves only through the angle indicated by the dotted lines. The illustration clearly shows the construction. The device is now being experimented with on the Northern of France, and has never before been published. The results of the trials will be

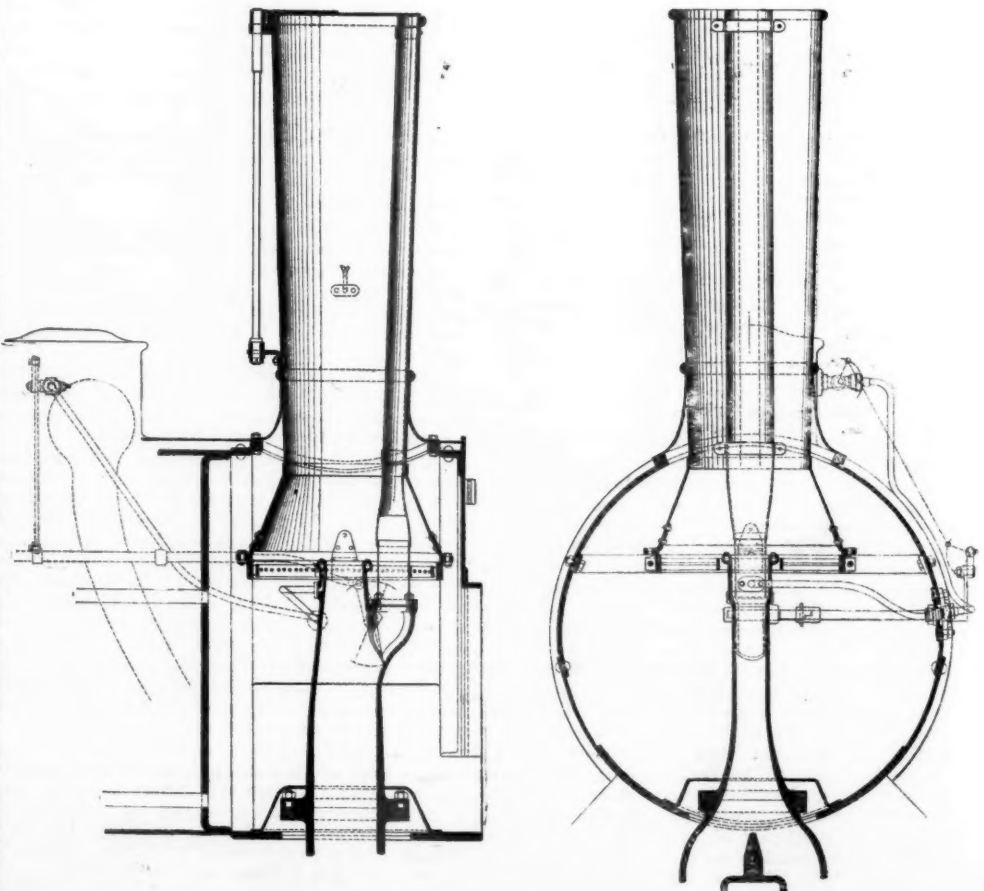
received with curiosity, if not with interest, it being a most original and novel arrangement.

Bridge Floor with Three Inside Guard Rails.

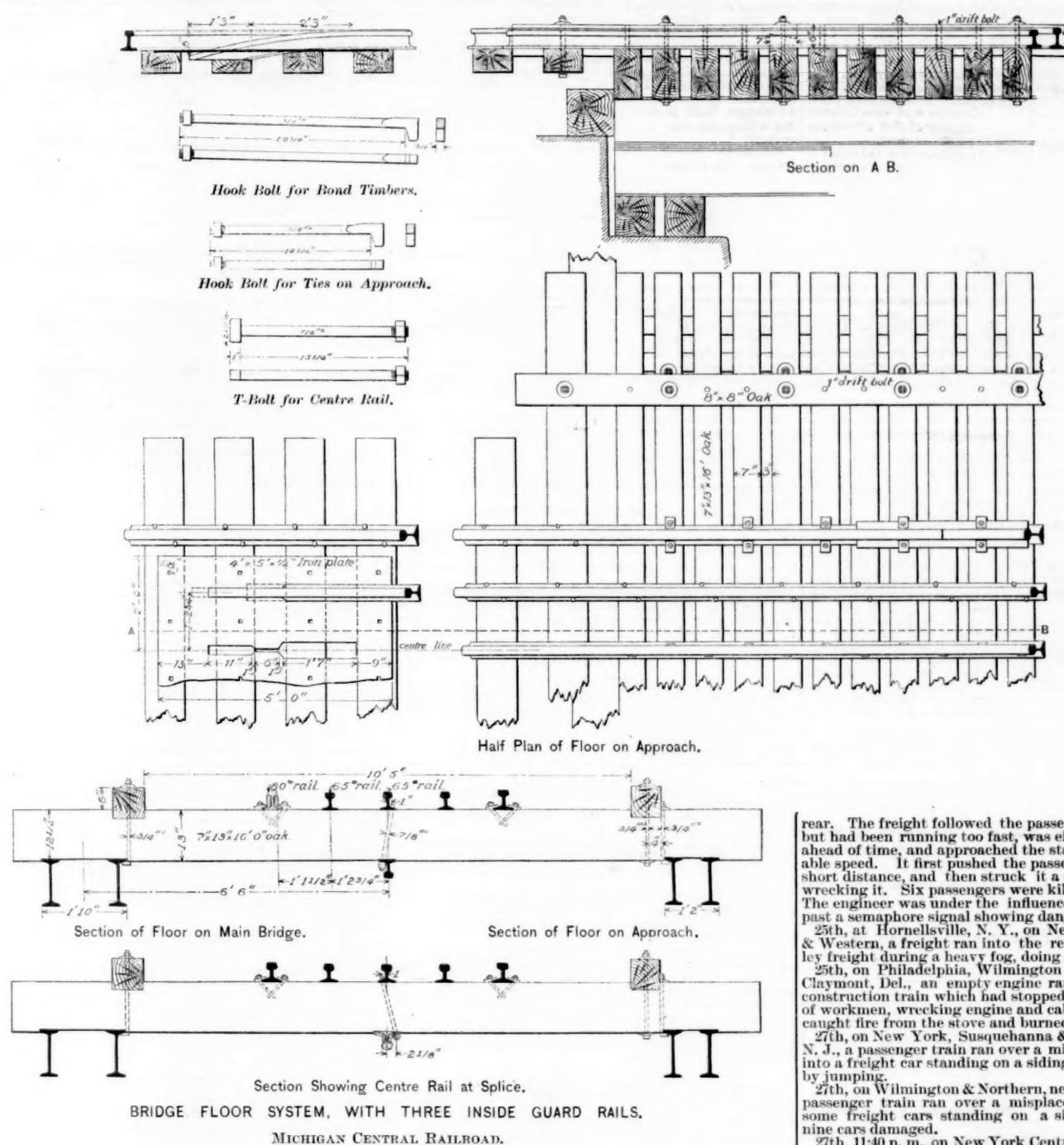
The novel arrangement of bridge guard rails shown in our illustration is now standard on the Michigan Central. This particular case shows the south track of the Niles Bridge. It differs from the standard practice of the road only in the placing of the ties. In this case no floor beams were used, and the ties are placed on edge. The usual practice of the road is to lay them on the broad face.

Three inside guard rails are used, and wherever the bridge floor admits of it, a fourth rail is used on the underside of the ties, bolted through and through with the guard rail on top of the ties.

The three guard rails are dipped down at the ends and put through a piece of boiler plate to prevent brake beams, etc., from catching the ends. This arrangement is clearly shown in the cuts. It is not the aim to rerail any wheels that are off the track before the bridge is reached. It is the experience of the road that in many, if not in most, cases where freight-car wheels have been derailed before reaching a bridge they have worked over past the centre line of the track, and the guard rails converging to a point at the centre line have aggravated the



DEVICE FOR SECURING A VARIABLE EXHAUST,
NORTHERN RAILROADS OF FRANCE.



mischief. With the three guard rails, as shown, wheels will be taken across the bridge in the same position relatively to rails that they have in going on the bridge; and, in case a truck is entirely out from under the car the rails are so close together that the car can slide across the bridge without having any corners catching in the ties. The provision against the bunching of the ties is very complete, as they are held firmly by the central line of bolts in addition to the outer guard timbers. The whole combination makes a floor that is hard to break up by a derailment.

Train Accidents in September.

COLLISIONS.

REAR.

1st, on New York, Lake Erie & Western, near Addison, N. Y., a freight train ran into the rear of a preceding freight, wrecking caboose and one car and disabling the engine. Conductor killed.

3d, on Buffalo, Rochester & Pittsburgh, near Bradford, Pa., freight train ran into the rear of a standing construction train, damaging engine and several cars. One trainman killed by jumping. It is said that the flagman sent out by the construction train had fallen asleep.

9th, on Chicago & Grand Trunk, at Lansing, Mich., a passenger train ran into some freight cars which had run out upon the main track from a siding, doing some damage.

10th, on Norfolk & Western, near Lynchburg, Va., a freight train broke in two while ascending a grade and the detached section ran back into a following freight, doing considerable damage. One trainman killed and 1 injured.

11th, on Staten Island Rapid Transit, near Tompkinsville, S. I., N. Y., a passenger train ran into the rear of a preceding passenger train standing on a trestle, which had been stopped in order to avoid striking the mast of a yacht which had dragged her anchor in a gale and drifted against the trestle. Two cars damaged; four passengers injured.

12th, on Cleveland, Akron & Columbus, near Akron, O., a construction train was run into at the rear by a freight train. Engine and six cars wrecked. The construction train sent back a flagman, but he did not go far enough.

12th, on Lehigh Valley, near Warsaw, N. Y., freight train broke in two and the detached sections collided. Ten cars were wrecked, including a number loaded with oil, which took fire and burned up.

13th, on Central of Georgia, near Colliers, Ga., a freight train broke in two and the parts afterward collided, wrecking five cars.

13th, on Louisville & Nashville, at Beaumont, Ill., freight train ran into the rear of a preceding freight, wrecking the caboose and killing a man in charge of horses.

14th, on Cumberland Valley, near Shippensburg, Pa., a freight train broke in two and the rear section ran into the forward one, throwing a number of cars over an embankment in a bad wreck.

16th, on Pittsburgh, Cincinnati & St. Louis, at Colliers, W. Va., a passenger train ran over a misplaced switch at full speed and crashed into some freight cars standing on a siding. The engine went into the ditch and was badly wrecked, the baggage car was stripped off its trucks, and the smoking car was derailed and damaged.

19th, on Iowa Central, near Scarborough, Ia., a circus train broke in two and the rear part collided with the forward one, wrecking two cars. Two circus men injured.

19th, on East Tennessee, Virginia & Georgia, near Powell's, Tenn., a freight train ascending a grade broke in two and the rear section ran back down grade and collided with a switching freight train, wrecking 5 cars and derailling a number of others.

19th, on Wabash, at Walton, Mo., the first of three closely following freight trains broke in two. The second train was flagged and stopped, but the third ran into the preceding one with sufficient force to push it into the caboose of the forward train, disabling two engines, wrecking several cabooses and a number of cars. A man riding in a caboose was killed.

20th, on Louisville & Nashville, at Dunmore, Ky., an extra freight ran into the rear of a preceding freight which had stopped for the purpose of cleaning the ashpan. The fireman, who was under the engine at the time, was killed.

23d, on Northern Central, near Havana, N. Y., a freight train broke in two and the detached sections collided, wrecking six cars.

24th, p. m., on Chicago, Rock Island & Pacific, at Auburn Park, Ill., a passenger car which was being cut off from a Blue Island suburban passenger train to be taken to Washington Heights was run into by a freight at the

rear. The freight followed the passenger from Chicago, but had been running too fast, was eight or ten minutes ahead of time, and approached the station at uncontrollable speed. It first pushed the passenger car forward a short distance, and then struck it a second time, badly wrecking it. Six passengers were killed and 10 injured. The engineer was under the influence of liquor and ran past a semaphore signal showing danger.

25th, at Hornellsville, N. Y., on New York, Lake Erie & Western, a freight ran into the rear of a Lehigh Valley freight during a heavy fog, doing some damage.

25th, on Philadelphia, Wilmington & Baltimore, near Claymont, Del., an empty engine ran into the rear of a construction train which had stopped to pick up a gang of workmen, wrecking engine and caboose. The caboose caught fire from the stove and burned up.

27th, on New York, Susquehanna & Western, at Lodi, N. J., a passenger train ran over a misplaced switch and into a freight car standing on a siding. Fireman injured by jumping.

27th, on Wilmington & Northern, near Coatesville, Pa., passenger train ran over a misplaced switch and into some freight cars standing on a siding. Engine and nine cars damaged.

27th, 11:40 p. m., on New York Central & Hudson River, near Palatine Bridge, N. Y., a westbound express train which had been stopped because of a breakage in the engine was run into at the rear by a following express train. In the forward train one sleeping car was badly wrecked and two private cars considerably damaged; and four passengers were killed and 12 or more injured.

In the second train the baggage car was thrown upon the tender and wrecked, and the engineer was injured. The trains were seven minutes apart at Fonda, 9 miles back, and were both running at 40 or 50 miles an hour, but the foremost one was run at reduced speed for about four miles before it was stopped, and this slackening reduced the interval between the trains so much that the flagman of the foremost, who ran back before his train stopped, met the other train before he had gone 500 (5) ft. The stoppage was on a curve, although it appears that there were several long tangents in the four miles which the train traversed after the breakage was known to the engineer. This accident was discussed in the *Railroad Gazette* of Oct. 4.

28th, on Union Pacific, at North Platte, Neb., a freight train ran into the rear of a freight train standing on the main track, damaging an engine and eight cars.

28th, on Baltimore & Ohio, near Harper's Ferry, W. Va., a freight train broke in two and the rear portion collided with a following freight, wrecking an engine and six cars.

30th, near Denton, Tex., a Missouri, Kansas & Texas freight ran into the rear of a Texas & Pacific freight. Engine derailed and overturned, caboose badly damaged. One trainman injured.

30th, 4 a. m., on Pittsburgh, Cincinnati & St. Louis, at Bowerstown, O., an eastbound freight train was run into at the rear by passenger train No. 2, wrecking the caboose and two freight cars and turning the engine of the passenger train across the tracks, stopping all traffic for several hours. The collision was caused by a misunderstanding of signals on the part of the flagman of the freight train. The second section of the freight had run in on a siding and sent back a man to flag the third section. The latter came to a stop and sent back a man to flag the passenger train. Before the passenger came along, however, the second section called in its flagman, and the flagman of the third section, which was still on the main track, mistaking the signal for his own recall, started in.

BUTTING.

2d, on Denver & Rio Grande, near Ogden, Utah, collision between passenger train and a construction train, which had its engine at the rear end, doing slight damage. The engine of the latter, being reversed and aban-

done just before the collision, broke away from the train and ran into the Ogden yard, where it collided with a switch engine, wrecking both. It is said that the construction train failed to take proper signaling precautions.

2d, on Danville & New River, near Martinsville, Va., butting collision between a passenger train and a construction train, wrecking the engines and several cars. A laborer was killed and two trainmen and one laborer were injured. The watch of the runner of the construction train is said to have been 16 minutes slow.

5th, at Granton, N. J., butting collision in a between a West Shore and a New York, Ontario & Western freight train, damaging the engines and five cars. One trainman injured.

8th, on the New York, Pennsylvania & Ohio, near Shenango, Pa., an express train ran over a misplaced switch and into the head of a freight train standing on a side track, damaging both engines and a baggage car. One trainman killed and one injured.

8th, on Lake Shore & Michigan Southern, near Millersburg, Ind., butting collision between two heavy freight trains, due to negligence of an operator, piling up both trains in a complete wreck.

8th, on New York, Lake Erie & Western, at Cuba, N. Y., butting collision between freight trains on a curve, wrecking the engines and 20 cars. One trainman killed, three injured. It is said that the accident was caused by one of the engineers mistaking the number of the train passed at the preceding station.

11th, on New York, Chicago & St. Louis, at Miller's City, O., a westbound fast freight train collided with a construction train in a fog, wrecking both engines and 15 cars. Two trainmen injured.

12th, on Detroit, Grand Haven & Milwaukee, near Waterford, Mich., butting collision between two freight trains, making a bad wreck. One of the trains had orders to meet three opposite bound trains at Waterford, but pulled out upon the arrival of the second.

12th, on Chicago, Rock Island & Pacific, near Utica, Ill., butting collision between passenger and freight trains.

13th, on Shenandoah Valley, at Buena Vista, Va., butting collision between two freight trains, making a bad wreck, which took fire and was partially consumed. One trainman killed.

13th, about 9 p. m., on Baltimore & Potomac, near Washington, D. C., butting collision between a passenger train and a special freight train, badly wrecking both engines, a passenger car, and six freight cars. One trainman killed, one trainman and four passengers injured. One of the main tracks had been obstructed, and in using the other as a single track the operator failed to hold one of the trains which had no right to the road.

13th, on Houston & Texas Central, near McDade, Tex., butting collision between construction trains, owing to a misunderstanding of orders, wrecking both. Two trainmen injured.

13th, on Northern Central, at Brillhart, Pa., butting collision between two freight trains, wrecking both locomotives and 15 cars. Fireman and a tramp injured.

14th, on Burlington & Missouri River, at Lincoln, Neb., passenger train ran over a misplaced switch and into a yard engine standing on a siding, damaging both locomotives.

16th, on Union Pacific, near Stromsburg, Neb., butting collision between two locomotives, one of which was badly wrecked.

18th, on Texas & Pacific, near Ranger, Tex., butting collision between two freight trains, doing considerable damage.

19th, on Chicago & Northwestern, at Stanhope, Ia., butting collision between two freights, doing considerable damage.

20th, on Union Pacific, near Evanston, Wyo., butting collision between a freight train and a light engine, doing considerable damage. Five trainmen injured.

20th, on Northern Pacific, at Trent, Wash., butting collision between a passenger train and a freight, disabling both engines. Brakeman killed by jumping, one trainman and a tramp injured.

20th, on Ohio & Mississippi, near Hanover Switch, Ill., butting collision between two freights, doing considerable damage.

21st, on Union Pacific, at Jersey Junction, Col., a passenger train ran over a misplaced switch and into a locomotive standing on a siding, badly damaging both engines. One trainman killed, one injured.

21st, on Chicago & Northwestern, at Blackberry, Ill., butting collision between a passenger train and a freight train, due to a misplaced switch, doing considerable damage. Two trainmen and several passengers injured and a tramp killed.

21st, on Boston & Maine, near South Lancaster, Mass., butting collision between a freight train and a locomotive pulling a caboose. Engines and 13 cars wrecked, one trainman killed and two injured. An operator accepted an order for one of the trains after it had passed his station.

21st, on Union Pacific, near Sandberg, Neb., butting collision between two freight trains, wrecking both engines and eight cars.

23d, on Chicago & Northwestern, at Flagg, Ill., a fast stock train ran over a misplaced switch and into a passenger train standing on a siding, wrecking the forward portions of each train. One trainman killed, three trainmen and three passengers injured.

26th, on International & Great Northern, at Palestine, Tex., butting collision between a freight train and a yard engine. Engineer injured.

28th, on Kansas City, Ft. Scott & Memphis, near Hillsdale, Kan., butting collision between freight and construction trains, wrecking the engines and a number of cars.

28th, on Lehigh Valley, near White Haven, Pa., butting collision between two freight trains, doing some damage.

28th, on East Tennessee, Virginia & Georgia, near Lime Stone, Tenn., butting collision between two freight trains, damaging both engines and four cars.

28th, on Baltimore & Ohio, near Wilmington, Del., butting collision between a passenger train and empty engine. Fireman killed.

29th, on Denver & Rio Grande Western, at Pleasant Valley Junction, Utah, a passenger train ran over a switch which had been purposely misplaced and into a construction train standing on a siding. Both engines damaged.

CROSSING AND MISCELLANEOUS.

3d, at the crossing in East Superior, Wis., collision between a Duluth, South Shore & Atlantic passenger train and a Northern Pacific stock train, disabling the engines. There was a dense fog at the time.

4th, at the crossing in Des Moines, Ia., collision between a Chicago, Rock Island & Pacific passenger train and a Chicago & Northwestern freight train, disabling both engines. Fireman injured.

5th, a Chicago & Atlantic freight train approached the

crossing at Enterprise, O., at uncontrollable speed and ran into a Cincinnati, Jackson & Mackinaw freight train, wrecking an engine and 10 cars and killing a brakeman. Two new engines in the forward part of the colliding train were also derailed and damaged and two machinists in charge of them were injured.

5th, at the Union Depot, in Kansas City, Mo., owing to a mistake in signaling, a Wabash passenger train ran into a Chicago, Rock Island & Pacific passenger train, damaging a baggage car and a smoker, the latter being overturned.

8th, at the crossing near Ames, Neb., a Union Pacific freight train ran into a Fremont, Elkhorn & Missouri Valley freight, wrecking six cars and the colliding engine.

10th, on Illinois Central, at Burnside, Ill., an engine ran into some freight cars. Several tank cars containing oil were wrecked, took fire and burned up.

13th, on Philadelphia & Reading, at Ashland, Pa., in a collision a passenger car attached to a work train was badly damaged and several employes injured.

16th, at Tioga Junction, Pa., on a slippery track and a descending grade a New York, Lake Erie & Western passenger train approached the station at too great a speed and ran into a Fall Brook Coal Co. engine standing on the main track, wrecking both engines and several cars of the passenger train. One trainman and one passenger killed, one trainman and 12 passengers injured.

17th, on Philadelphia, Wilmington & Baltimore, at Ontario, Md., collision between passenger and freight trains, doing considerable damage.

20th, on Lake Shore & Michigan Southern, in Cleveland, O., a freight train ran into a freight train switching across the main track, wrecking both engines and five cars. A tramp was killed.

23d, on Baltimore & Ohio, at Marriottsville, Md., collision between a freight and a construction train. Fireman killed.

24th, on Baltimore & Ohio, near Wheeling, W. Va., freight train ran into a construction train, damaging engine and caboose. Engineer killed.

27th, on Chicago, Rock Island & Pacific, near Burlington, Ia., collision between passenger and freight trains, damaging both engines.

28th, at the crossing in Memphis, Tenn., a Kansas City, Ft. Scott & Memphis passenger train was run into and three cars overturned by a St. Louis, Iron Mountain & Southern switching freight. Three passengers injured.

DERAILMENTS.

DEFECTS OF ROAD.

3d, on Knoxville & Augusta, near Augusta, Ga., freight train thrown from the track by the spreading of the rails, wrecking several cars.

13th, on Chicago, Milwaukee & St. Paul, at St. Paul, Minn., engine, baggage and mail cars of passenger train derailed by the spreading of the rails and badly damaged.

15th, on Norfolk & Western, near Lynchburg, Va., two cars of a special passenger train broke through a bridge which had been weakened by heavy rains, injuring some 15 passengers.

16th, on Green Bay, Winona & St. Paul, near Shiocton, Wis., a bridge over Wolf River gave way under a freight train. Engineer killed, fireman and several bridgemen injured.

16th, on Evansville & Terre Haute, near Patoka, Ind., a bridge gave way under a freight train, all but the locomotive and four foremost cars going down into a creek in a bad wreck.

18th, on St. Louis & San Francisco, near Leo, Kan., a passenger train was thrown from the track by the spreading of the rails, three cars going over a 15-foot embankment. Three passengers killed, three injured.

18th, on Old Colony, at West Mansfield, Mass., several cars of a freight train derailed at a frog and wrecked.

23d, on St. Louis Mountain & Southern, near La Grange, Ark., passenger train thrown from the track by the spreading of the rails.

DEFECTS OF EQUIPMENT.

16th, on Oregon Railway & Navigation Co.'s road, near Winona, Wash., seven cars of a freight train derailed and ditched by the breaking of an axle.

20th, on East Tennessee, Virginia & Georgia, near Macon, Ga., several cars of a freight train derailed by a broken truck.

24th, on Pittsburgh, Fort Wayne & Chicago, near Agnes, Pa., three cars of a freight train derailed by the breaking of an axle.

25th, on West Shore, near Pattersonville, N. Y., five cars of a freight train derailed by the breaking of a draw-bar.

28th, on Lehigh Valley, near Mud Run, Pa., several cars of a freight train derailed by the breaking of an axle and thrown over an embankment.

NEGLIGENCE IN OPERATING.

3d, on Central Vermont, at Altona, N. Y., while the engine of a freight train was detached for the purpose of taking water, the train, having been insufficiently braked, started and ran back down grade to Wood's Falls, 16 miles, where 13 cars were derailed and wrecked.

6th, on New York, Chicago & St. Louis, at Pymatuning, Pa., the last car of a passenger train was derailed and overturned by a switch being prematurely thrown. Four passengers injured.

6th, on Missouri, Kansas & Texas, at Calhoun, Mo., passenger train derailed by a misplaced switch; the engine was overturned.

10th, on Union Pacific, near Rock Springs, Wyo., freight train derailed by a misplaced switch, the engine and several cars going into the ditch. Three trainmen injured.

13th, on Philadelphia & Reading, at New Castle, Pa., a coal train descending a heavy grade became uncontrollable and was derailed at a curve, nearly the entire train plunging over an embankment, making a bad wreck. Engineer and fireman injured by jumping.

18th, on Delaware, Lackawanna & Western, at Great Bend, Pa., engine and forward truck of express car of passenger train derailed by a misplaced switch.

21st, on Pennsylvania, in Philadelphia, Pa., an engine standing in the yard unattended started suddenly and went down into a turntable pit, striking an engine standing on the table. Both engines and the turntable were damaged.

27th, on Cleveland, Cincinnati, Chicago & St. Louis, at McCoy's, Ind., passenger train derailed and ditched by a misplaced switch. Four trainmen injured. It is thought that the switch had been maliciously misplaced.

27th, on Chicago, Rock Island & Pacific, at Davenport, Ia., an engine hauling a freight car derailed by a misplaced switch.

27th, on Burlington, Cedar Rapids & Northern, at Salem, Ia., freight train derailed by a misplaced switch. Engineer injured in jumping.

30th, on Old Colony, at Marlboro, Mass., six cars of a freight train loaded with coal broke loose and crashed through the end of a coal shed and went off the end of the track. One trainman injured.

UNFORESEEN OBSTRUCTIONS.

5th, on Pennsylvania, near Webster Station, Pa., a construction train ran over a cow and several cars were derailed and damaged. A laborer was killed and two injured.

13th, on Hannibal & St. Joseph, near Liberty, Mo., a Chicago, Rock Island & Pacific train ran over a calf and nine cars were derailed and damaged.

16th, on Central of Georgia, near Hancock, Ga., a freight train was derailed by a sleeper which had been maliciously placed upon the track. The engine was overturned in the ditch and a dozen cars wrecked. Fire broke out and partially consumed the wreck. Three trainmen injured.

17th, on Central of Georgia, near Atlanta, Ga., a southbound train was derailed by a sleeper which had been purposely placed upon the track. Three trainmen killed.

18th, on Fall Brook Coal Co.'s road near Westfield, Pa., a passenger train moving backward ran over a cow and three coaches were derailed and damaged. Conductor injured.

19th, on Louisville & Nashville, near Clarksville, Tenn., a freight train ran into a mass of rock which had rolled down upon the track in a cut at a curve. The forward portion of the train was derailed and wrecked, some of the cars going down into the Cumberland River. Two trainmen killed and several injured.

21st, on Fremont, Elkhorn & Missouri Valley, near Wisner, Neb., a freight train ran over some cattle, derailling and wrecking the engine and four cars. One trainman injured.

23d, on Delaware, Lackawanna & Western, near Ithaca, N. Y., engine of passenger train was derailed and overturned by a spike which had been placed upon the track by a boy. Engineer killed, fireman injured.

25th, on Denver & Rio Grande, near Red Cliff, Col., a west-bound passenger train ran into a boulder which had rolled down upon the track at a curve. Engine and mail car wrecked and the balance of the train derailed. Three trainmen injured. The mail car caught fire, but the flames were quickly extinguished.

27th, on Pennsylvania, near Bellefonte, Pa., a passenger train ran over a cow and the engine and baggage car were derailed and ditched. Two trainmen injured.

28th, on Oregon & California, near Turner, Ore., an accommodation train ran into a flock of sheep and the engine was derailed and overturned in the ditch, injuring three trainmen.

UNEXPLAINED.

3d, on Virginia Midland, near Accotink, Va., caboose of freight train derailed and thrown down an embankment, killing two drovers.

3d, on Missouri, Kansas & Texas, near Clifton, Mo., freight train derailed and partially wrecked, killing a number of cattle. Three trainmen injured.

5th, on Kentucky Central, near Silver Creek, Ky., the rear car of a passenger train was derailed and overturned, injuring several passengers.

6th, on Fall Brook Coal Co.'s road, near Jersey Shore, Pa., 11 cars of a freight derailed and wrecked.

6th, on Union Pacific, near Birdseye, Col., all of a passenger train but the locomotive was derailed and overturned.

7th, on Chicago, St. Paul & Kansas City, near Lida, Ia., caboose and several cars of a freight train were derailed and damaged, killing a brakeman.

10th, on Delaware, Lackawanna & Western, at Owego, N. Y., four cars of an accommodation train derailed and damaged.

12th, on Southwestern, near Americus, Ga., five cars of a freight train derailed and damaged.

13th, on Southwestern, near Albany, Ga., freight train derailed, wrecking an engine and three cars.

16th, on Wabash, near Wabash, Ind., three cars of a freight train derailed and wrecked.

17th, on Georgia Railroad, at Milledgeville, Ga., several cars of a freight train derailed.

18th, on Kansas City, Fort Scott & Memphis, in Kansas City, Mo., a car of a passenger train was derailed.

18th, on Atchison, Topeka & Santa Fe, in Kansas City, Mo., engine derailed.

19th, on Southwestern, near Walker's Station, Ga., freight train derailed.

24th, on Burlington & Missouri River, at Falls City, Neb., five cars of freight train derailed at the crossing of the Missouri Pacific and wrecked.

25th, on Southern Pacific, at New Orleans, La., two cars of a switching freight derailed and upset.

26th, on Gulf, Colorado & Santa Fe, near Temple, Tex., 10 cars of a freight train derailed and damaged. Brakeman injured.

26th, on Pennsylvania, at Bolivar, Pa., engine and eight cars of a freight train derailed and wrecked.

28th, on Wilmington, Columbia & Augusta, near Wateree, S. C., passenger train derailed.

28th, on New York, Lake Erie & Western, at Owego, N. Y., two cars and caboose of freight train derailed.

28th, on Rome, Watertown & Ogdensburg, near Watertown, N. Y., 16 cars of a freight train derailed and wrecked.

29th, on Philadelphia & Reading, at Philadelphia, Pa., the rear car of a southbound passenger train was derailed and thrown against an engine passing on the opposite track and overturned. Two passengers injured.

29th, on St. Louis, Alton & Terre Haute, at Lementon, Ill., 10 cars of a freight train derailed and damaged.

29th, on Fremont, Elkhorn & Missouri Valley, at Omaha, Neb., car of switching freight train derailed.

OTHER ACCIDENTS.

23d, on Boston & Albany, at Springfield, Mass., a car in a New York, New Haven & Hartford passenger train was struck and damaged by a large stone, which had got beyond control while being swung on a derrick near the track. Three passengers injured.

29th, on Northern Pacific, near La Crosse, Wash., an axle under a stock car in a freight train broke.

A summary will be found in another column.

The Delany Line Adjusting System.

We give herewith a diagram showing the method of operation of this device, which was exhibited at the late Washington meeting of the Railroad Telegraph Superintendents, and was referred to in the *Railroad Gazette* of Oct. 25. The name given to it by the inventor is slightly misleading, although it is, perhaps, the best that could be found. The instrument operates to obviate the neces-

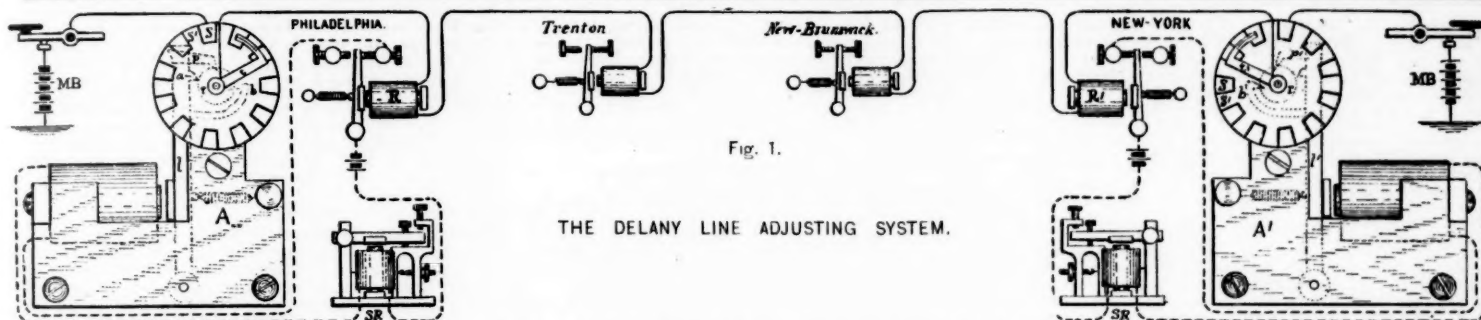


Fig. 1.

THE DELANY LINE ADJUSTING SYSTEM.

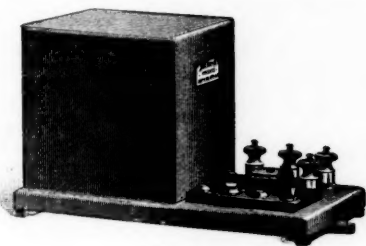


Fig. 2.

sity of adjustment rather than to adjust. As the difficulties encountered in working with small stations in wet weather are an annoyance to many persons on every road which does not possess first-class telegraph lines on all divisions, we shall describe the working of the apparatus more in detail than would be necessary to make it clear to telegraph operators.

Telegraph lines are usually worked by means of two batteries, one at each end. The electric current "flows" through a circuit, consisting of home battery, *MB* fig. 1, key, relay, line wire, distant instruments and battery and back again to starting point. This return conductor (which might be a wire) is the earth. Messages are sent by opening and closing the circuit; that is, by alternately attaching and detaching the battery *MB*, as with the key shown above the battery in the cut. The opening of a key at a way station has the same effect. On a perfect line the lifting of a key at any point on the line causes the same movement in the lever of the receiving instrument at all the stations by withdrawing the electricity, which demagnetizes the relay and allows the spring to withdraw the armature. But on a poorly insulated line a part of the current which should flow from one end to the other escapes through the poles to the ground at various points along the line. Poles wet by rain may become good conductors of electricity and greatly increase this "escape." Under these circumstances, if Philadelphia raises (opens) his key he opens his own relay, as usual, but the relay at New York may fail to open because the New York battery continues to act in spite of the opening of the circuit at the Philadelphia end, the circuit being completed through the partial ground at the wet poles. To overcome this, the New York operator increases the tension of the spring to his relay, so that it will not remain closed except under the combined influence of both batteries. The practical trouble in working is that the operators at way stations, who have many other duties to perform and who have their attention drawn away from the instrument half an hour at a time, forget to adjust (tighten) their springs. The division operator at the terminal may, therefore, repeat their calls any number of times without making himself heard by them.

In using the adjusting instrument it is presumed that there are batteries at both ends of the line, and that both terminal operators are constantly alert and keeping their instruments in proper adjustment without aid from the "adjuster." This being so, the effect of the instrument is to cause both batteries to be withdrawn from the line whenever either one is cut off. If Philadelphia opens and closes his circuit a hundred times, no matter how rapidly, he opens it each time near the New York battery as well as near his own. A way-station relay, therefore, whose adjustment is anywhere near what it ought to be, even if the spring is far too slack, is sure to open at every stroke.

The operation of the instrument is as follows: The adjuster magnet is placed in the same circuit with the local sounder, five cells of gravity battery being necessary to operate the two. There is connected with it a resistance coil which is switched into the local circuit whenever the adjuster is disconnected and out of use, which, of course, is the case at all times during fair weather. The circuit from the main battery goes first to a spindle *r*, fig. 1, which is in the centre of a circular plate, divided into segments, as shown. Each alternate segment is a conductor, and is connected to the line wire, while the other is an insulator. The radial arm *t*, pivoted on the spindle in the centre of the plate, carries at its outer end a "trailer," and the arm, in revolving, draws the trailer over the segments. At every movement of the adjuster-magnet, which opens and closes in unison with the sounder, the trailer moves from a conducting segment, on which it normally rests, across the intervening non-conductor to the next conductor. This has the effect of opening the main line and closing it again, the whole

of which is accomplished after the beginning and before the termination of the stroke of the sounder. The relay being properly adjusted, this is effected by the movement of the key at the distant terminal, precisely the same as when the home key is operated. The armature of the adjuster-magnet operates the trailer by means of a simple lever and ratchet. Only two adjusters are needed, one at each terminal, regardless of the length of the line or the number of way stations.

Fig. 2 shows the outward appearance of the apparatus. The inventor is Mr. P. D. Delany, of 84 Broad street, New York City, from whom any further particulars may be had.

Hygiene on Railroads.

Water supply for drinking purposes, and water closets and privies on railroads formed the subject of a paper read before the American Public Health Association, at Brooklyn, N. Y., last week, by Dr. S. W. Latta, Chief Medical Examiner of the Pennsylvania Railroad Relief Department. The following is the substance of the paper:

The matter of railroad sanitation is becoming a very important one and is being agitated by the state boards of health throughout the country. Recognizing some of the difficulties in the way, the speaker continued: There are to be considered the questions of water supply to cars and stations for drinking purposes, water closets in cars and at stations, and the ventilation of cars.

On cars, the water cooler is a long, narrow tube, opening from the top of the car, on the outside of the roof, inaccessible except from that locality, and very difficult to clean. Those entrusted with the duty of supplying the water and ice are men wholly ignorant of the requirements of health, and, being usually limited as to time, are not as cleanly as they should be. The cooler should be remodeled. It should be a tube within a tube, easy of removal, so that it could be taken out frequently, and thoroughly cleaned by scalding. This should be done daily.

The ice should be taken from a pure source, or, better still, a coil of pipes made to surround the tube for the production of cold, by means similar to the cold-storage process. The water supplied to the cars should be taken from a pure source, and passed through a settling reservoir; or, better, perhaps, through a large filter, similar to the Hyatt. The filter and filter bed ought to be washed every day. Water pipes should lead direct from these reservoirs to the cars. The water being good, and the water coolers in the cars frequently cleansed, there should be little, if any, danger from these sources. The importance, however, of frequent and thorough cleaning of these receptacles cannot be overestimated, and a system which would meet these requirements ought to be in operation on every railroad.

The matter of water supply for drinking purposes for stations, shops and large freight warehouses, where many persons congregate, is not less important. It is estimated that 45,000 persons pass through the Broad street station of the Pennsylvania at Philadelphia daily, and from 28,000 to 35,000 gallons of water is the daily consumption at this station for all purposes. These people spread themselves throughout the length and breadth of the country, and it can readily be seen what a source of infection they might become.

The Pennsylvania Railroad Co. appreciated these conditions, and the intelligent general manager of that company, Mr. Chas. E. Pugh, in May, 1885, issued the first sanitary circular. At the same time that company adopted a standard disinfectant, manufactured at its own laboratory, from a formula prepared by the company's chemist, Dr. Charles B. Dudley. This disinfectant is liberally furnished throughout the entire system, and its use is required in all cars and at all stations. In May, 1889, the general manager issued a second sanitary circular, more comprehensive in its scope and mandatory in its tone. This is widely circulated and will prove a powerful wedge in the opening up of proper railroad sanitation.

The question of water closets at stations is a serious one. In towns where there is a public water supply and public drainage the problem is simple enough. But when we come to consider the small country station where the station building and outhouses are confined to a small area, we have a more difficult question to meet. Three plans, one of which, it seems to me, might suffice, present themselves:

1st. A water-tight receptacle, ventilated through the roof of the privy, having means for attaching the hose of an odorless excavator.

2d. If means for flushing are at hand, the Waring system of land irrigation.

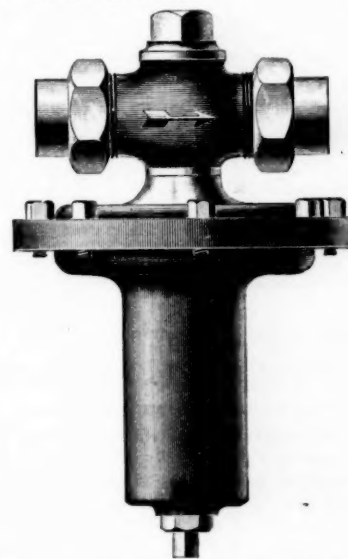
3d. And as seems to me to be the most feasible plan, is to have the privies built of a standard size; have a standard box to go under the seat from the back, fitting snugly, made of oak, water-tight, with caulked seams. Keep a supply of dry sifted ashes or dry earth, with a small shovel, in a box in the privy, with printed instructions over the box to throw some of the contents over the excrement each time any is deposited. Hold the station agent or track foreman responsible for the proper use and supply of the dry earth and proper disinfection of the boxes, and have a system of sanitary inspections to see that this is done. At stated intervals, have the work train come at night, take away the full boxes, and replace them with clean and disinfected ones. The material contents should be hauled to a designated place and dumped, and they could be disposed of for agricultural purposes or buried.

Probably the subject hardest to dispose of satisfactorily is the arrangement of water closets in passenger cars; but I believe the earth closet would best meet the sanitary requirements. The present practice is certainly reprehensible from a sanitary standpoint. The enforcement of any system of sanitation demands inspection by sanitary experts, and the announcement of any system of sanitary rules will result negatively, unless there is also included provision for such inspection. These inspectors need to be professional men, well grounded in the theory and practice of sanitary science as now taught, and clothed with power to enforce the necessary sanitary regulations. Such inspections should be made frequently, and systematic reports made.

The Mason Car Service Valve.

In the heating of railroad cars by steam there has been found much difficulty in maintaining the same temperature and pressure in the rear car of a long train as in the forward car.

This difficulty may be largely overcome by reducing the locomotive boiler pressure to about 40 lbs. in the train pipe by a reducing valve placed in the cab and then, by a less costly valve placed under each car, reduce to the desired pressure.



The Mason Regulator Co., of Boston, in their "car service valve," of which the accompanying cut is an illustration, have endeavored to supply this want. The valve is very cheap in cost, although well made, the valve body being of composition and the lower part of iron. The connections are fitted with couplings so that it can be instantly applied. The pressure can easily be changed by means of a nut at the bottom of the valve.

Forward Truck Wheels of Engines.*

It is a well-known fact that the forward truck wheels of an engine guide it around curves, and that any inequalities in the track have got to be first overcome by these wheels, consequently their condition is of far greater importance than any other pair of wheels in a train.

It is a matter of easy calculation that in a pair of 33-in. wheels, varying in diameter, $\frac{3}{8}$ in. the larger wheel will have travelled 50 in. in one mile further than

* Extracts from a Paper by Mr. Thos. A. Griffin, before the Northwest Railroad Club.

the smaller one, owing to its greater circumference. Under these conditions too great care cannot be taken to see that forward truck wheels of an engine are as nearly as possible of the same diameter. Having done this, the next thing to do is to watch them closely and see that they are kept that same uniform diameter, thereby enabling the wheels to travel free as regards either side of the track, because, as I stated before, it can be readily ascertained that the smaller wheel must necessarily be held against the rail by its flange during the greater part of all its service. This is true either upon straight track or upon curves. In the case of a wheel which has gone to sharp flange, either from not being carefully paired or the chills being softer on one than the other, or from any other possible cause, the conditions are essentially dangerous, because on straight track it is liable to strike the point of a frog, owing to its hugging the rail, or strike against the sharp corners of a crossing, chip out the flange, thereby causing derailment. But the greatest danger is on curves to the smaller diameter.

We will suppose a pair of wheels in which one of the wheels has run to sharp flange, thereby indicating that it has a lead that way, or possible inequalities in the wheel, or possible inequalities in the engine, which have given it a right or left hand lead, as the case may be; this wheel with the sharp flange is unquestionably held tight to its rail. If on the curve there is additional weight brought to bear, and if any of the joints of the rails have a bad fit or the bolts become loose, as bolts will in splice bars, there is additional danger. We will suppose that this is the case on two rails on a curve, and we will designate the two rails as 1 and 2. The wheel coming in contact with rail 1 pushes against it and crowds it out under strong pressure. At the junction of rail 1 and rail 2, rail 2 has not as yet received this pressure, and the consequence is that rail 1 has pushed out, so that at the junction of the two rails rail 2 projects inside from 1 in. to 1 in., as the case may be. The flange, instead of rounding a smooth surface, comes in contact with an abrupt stop, and the result is that it either breaks or climbs the rail. As flanges of car wheels are not designed for this kind of service, the result is that a piece of the flange is knocked out, and if a derailment does not occur then, at each succeeding revolution of this wheel this sharp point which has been left where the piece of the flange is out comes in contact with the rail until another piece is knocked out, and so on until the whole flange is stripped from the wheel before it leaves the track.

What I desire to say, in placing myself on record, is this: Instruct your inspectors, the minute they see the forward truck wheels on an engine from any cause leading to sharp flange, to immediately have those wheels changed and repaired, because it matters not whether they are worn out to what is recognized as the standard at which sharp flange wheels should be taken out, the condition and the service of the wheel and its liability to accident are all identical to the wheel which has its flange worn more, and that the only difference between this and the much more worn flange is the variation in the thickness of the metal which is left in the flange.

Weight and Capacity of English Passenger Stock.

The question of the comparative dead weights carried by English and American railroads has been much discussed this summer without much accurate information regarding the actual weights of the equipment. The table herewith gives the capacity and weight of the standard equipment of the London & Northwestern, and may be taken as authentic, having been kindly furnished us by Mr. F. W. Webb, Locomotive and Carriage Superintendent:

PASSENGER COACHES—LONDON & NORTHWESTERN RAILWAY.

DESCRIPTION OF CARRIAGE.	Length of body.	Width of body.	Number of compartments.	Length of compartment.	Carriage capacity.	Weight of Coach.
						Tons. Cwt. Qrs.
42-ft. first-class carriage.	42 ft.	8 ft. 6 in.	Four first-class. Four lavatories. One luggage.	First class, 7 ft. 4 in. Lavatories, 3 ft. 7 in. Luggage, 4 ft. 6 in.	28 passengers.	19 12 0
32-ft. first-class carriage.	32 ft.	7 ft. 9 in.	Four.	7 ft. 9 in.	24 passengers.	11 16 2
32-ft. composite carriage.	32 ft.	7 ft. 9 in.	One first. One second. Two thirds. One luggage compartment.	First class, 7 ft. 4 in. Second class, 6 ft. 6 in. Third class, 6 ft. 3 in. Luggage, 4 ft. 10 in.	8 first-class passengers. 8 second-class " 20 third-class " "	11 17 3
42-ft. third-class carriage.	42 ft.	8 ft.	Seven.	5 ft. 10 in.	70 passengers.	18 2 2
42-ft. third-class carriage.	42 ft.	8 ft.	Six, and one luggage compartment.	5 ft. 10 in.	60 passengers.	18 2 2

The London & Northwestern Railway at the Paris Exhibition.

Some portions of the London & Northwestern Railway exhibit at the Paris Exposition were historical as well as novel, and illustrative of the practice of that road. The following are extracts from a description prepared by the Mechanical Department:

A full size model of the "Rocket." This model represents the original engine as it appeared when it competed for the prize of £500 offered by the directors of the Liverpool & Manchester Railway Co. at Rainhill in 1825. The model has been prepared from various drawings, and also from information given in the *Mechanics Magazine* of 1825. The engine weighed in working order 4 tons 3 cwt. It ran at the rate of 12½ miles per hour with a load equivalent to three times its own weight, and when taking a carriage and passengers it traveled at the rate of 24 miles per hour. The model stands on old fish-bellied wrought-iron rails and stone sleeper blocks taken up from the archway where the old engine used to stand, and which formed part of the original Liverpool (Crown street) station.

A high-pressure engine designed by R. Trevithick about 1803-9 and made by Hazeldine & Co., of Bridgford. This engine was found at Hereford in a dismantled state by Mr. F. W. Webb, of Crewe, in 1883, and purchased as scrap iron. The parts were taken to Crewe and put together. Some of the parts were found to be broken; these were mended, and a few missing pieces replaced and made to accord as nearly as possible with the illustration in "The Life of Trevithick." The boiler is of cast

iron, with the cylinder, which is vertical, placed inside it. The working pressure was 60 lbs. per inch. The cast-iron manway cover bears the following inscription: "Hazeldine Bridge-north, No. 14." This firm appear to have been the makers of many of Trevithick's engines.

Old fish-bellied cast-iron rails and stone sleeper blocks which were taken up from the Cromford & High Peak Railway, and formed part of that line when it was first constructed.

Blenkinsop's rack rail and wheel, as laid down on the Middleton Colliery Railway, near Leeds, in 1812.

Old Crewe steel rail, 2 ft. 6 in. long. This is a piece of one of the 21-ft. steel rails first laid down at Crewe station in 1863. It was turned in 1866 and taken up in 1875. It is estimated that 72,000,000 tons have passed over it. The greatest wear of the tables is .85 in. Loss of weight, 20 lbs. per yard.

Model of compound engine (Webb's system): The total miles run by the 75 compound engines now in use on the L. & N. W. system since their introduction in 1882 amount to 11,644,222, and the average consumption of fuel of all types of these has been 32.9 lbs. per mile. As illustrative of the kind of work these engines are called upon to perform, it may be stated that the one named the "Marchioness of Stafford" between Dec. 17, 1885, and May 31, 1889, ran (1) 244 trips from Crewe to Carlisle and back with a maximum load of 22 coaches, and an average load of 13 coaches in both directions; (2) 243 trips from Crewe to London and back, with a maximum load of 22 and with an average load of 13 coaches; (3) 14 trips between various points, with a maximum load of 16 and an average of 9 coaches, covering in all a distance of 154,312 miles with a coal consumption of 36.5 lbs. per mile, including that burnt whilst standing in steam, and in fact issued for all purposes. She was first turned out of the Crewe workshops on Feb. 28, 1885, and on April 20 following was sent to the International Inventions Exhibition, and her designer and builder, Mr. F. W. Webb, was awarded the gold medal for railway plant by the Executive Council. On Nov. 30 she arrived back at Crewe, and on Dec. 17, 1885, commenced her working career, continuing in active service until Jan. 5, 1887, when she went into the workshops for repair until Feb. 22, upon which date she recommenced duty, and remained steadily at work until March 27, 1888, when she was again laid up for 17 days, but having undergone the requisite overhauling was set to work, and at the end of June, 1889, was still regularly employed. The average consumption of fuel of 40 of her class and dimensions has been 30.8 lbs. per mile, while the loads mentioned above may be taken as fairly typical. The average cost of maintenance compares very favorably with that of other classes, and in all respects the commercial results obtained with compound engines on the L. & N. W. system up to the present time have been very satisfactory, and have shown to great advantage in the case of one of the ordinary type of Metropolitan engines working on the District Railway, which was converted into a compound some time ago. This engine has run 178,337 miles since its conversion, the average consumption of coal being 23.2 lbs. per mile, including the usual allowance for raising steam, while the average consumption of the same type of engine, non-compound, doing similar work, was during the past six months 32.4 lbs. per mile. A model of one of these engines is exhibited.

THE SCRAP HEAP.

Notes.

The yard trainmen of all the roads in Memphis, Tenn., struck last week for an increase of pay.

In a train accident at Hatras, near Agra, India, Oct. 28, fifteen persons were killed and forty injured.

A fireman in his cab on a freight train at 3 a. m., near Somerville, N. J., one morning last week, was seriously

The Wrecker, Not the Train, Wrecked.

Near Rochester, Ind., on Thursday night, Oct. 24, on the Lake Erie & Western, at a point where a wooden structure is being replaced by an iron bridge, people were awakened by cries for help, and, upon going to the trestle, found one man trying to lift a heavy timber which had fallen upon his comrade. Investigation showed that they had tried to remove one of the supports, and in this manner the fallen man had been pinned down. The uninjured man was recognized as a fellow who had recently served a term for train-wrecking. Both were arrested.

Sunday Trains in Massachusetts.

The Massachusetts Railroad Commissioners have rendered the following decision in regard to the running of Sunday trains over the Providence division of the Old Colony: "Ordered, that the Old Colony Railroad Co. is hereby authorized to run trains on the Lord's day on the Providence division of its road, as set forth in the schedule filed with its petition, and arranged to take effect Oct. 14, 1889, except that the train leaving Boston for Dedham at 10:30 a. m., and the 6:30 p. m. train from Dedham to run via West Roxbury instead of via Readville." It appears that the road ran the trains several months without getting permission, according to law; then, when certain residents complained, it made formal application. Its law breaking seems to have been forgiven. President Choate said that personally he did not believe in the running of Sunday trains, but that they were run to accommodate the public and because the public demanded them. (Several citizens petitioned the Commissioners to authorize the trains.) No employees were required to work on these trains except voluntarily.

Grade Crossing Fights.

The bitter crossing fight between the Duluth, Crookston & Northern and the St. Paul, Minneapolis & Manitoba, near Crookston, Minn., after two days of skirmishing on both sides, was brought to a focus Sunday last. At 12 o'clock on Saturday night about 200 men drove to the disputed crossing, where they joined the Duluth, Crookston & Northern forces, and operations towards perfecting the crossing were begun. Although the utmost secrecy had prevailed, the Manitoba people had evidently learned that an attack would be made, and were fully prepared. Four heavy trains of cars, well equipped with men, effectively blocked the track for half a mile above and below the proposed crossing. There was only one weak point in their arrangements to prevent the crossing. About 50 ft. east of the proposed crossing was a highway which crossed the Manitoba track. They were compelled by law to keep this road open. The Duluth, Crookston & Northern, however, had obtained permission from the town authorities to use it temporarily as a crossing. When, therefore, they found that even with their large force, they were unable to get over at the original point, they put men and teams to work, and by daylight had the new line laid within a few feet of the Manitoba tracks. The Manitoba men had not previously interfered, but they were then ordered by Superintendent James to do so. He was immediately arrested, and, notwithstanding a vigorous resistance, he was carried off to jail. An attempt to rescue him failed, the Duluth, Crookston & Northern forces being the greater. In obedience to orders from Superintendent James, the Manitoba engineers wrecked flat cars and an engine on the track and prevented their removal, whereupon they also were arrested. After a long argument of the case, the Duluth, Crookston & Northern decided to await the legal decision on the injunction case.

The New York *Herald* thus reports an incident in the construction of the Waverly & New York Bay road, which is a branch of the Pennsylvania, projected to run through the lower end of Newark: "The new road is laid out to cross the Elizabeth and Newark cut-off of the Central of New Jersey, and for weeks 500 men have been engaged in leveling the New York garbage that is being used as a filling for roadbed. No permission had been asked to cross the Central's tracks. * * * But the Central on Saturday sent two heavy freight engines from Communipaw to the point where the new road would cross the branch. There the engines were jacked up and the rails removed from beneath them. Then they were let down upon the soft ground, into which they sank. Central trains are run on a loop that was put in before it was thought there would be any trouble.

New Construction in California.

The State Railroad Commission of California in its annual report estimates that the track laying for the year 1889 will not exceed 125 miles, which makes the total road of the state about 4,250 miles. In 1888, 472 miles of track were laid, and in 1887, 392 miles. Up to date this year 90 miles of new track has been laid, and there is yet approaching completion by the Southern Pacific a short cut line across Sutter County, from Knight's landing to Yuba City, 20 miles. Since last January the San Diego Cuyamaca & Eastern road, 22 miles long, has been built from San Diego to Lakeside. The San Francisco & North Pacific has pushed its line to Ukiah, 14 miles. The Southern Pacific Company has extended its line from Newman on the west side of the San Joaquin River to a point known as Terminus, 21 miles from Newman. Other work has been done here and there. For next year much more construction work is predicted, especially by the Southern Pacific Company.

The Price of Ferro-Manganese.

There has been a remarkable rise in the price of ferro-manganese and a noticeable rise in the price of spiegel-eisen this year; the first rising from \$55 to \$90, or 64 per cent., and spiegel from \$28.50 to \$40. The rise is based on both an extended demand for steel and a decreased production of ferro-manganese. Our production of high-grade manganese ores in 1888 was only 25,500 tons, 9,024 tons less than in 1887, and the importation into Europe decreased from 120,615 to 92,649 tons for the same two years. Of this rather more than half came from the Caucasus. The *American Manufacturer*, commenting on the present scarcity, thinks that additional sources of supply may be developed in Virginia, Arkansas and some other Southern states when the present high price will counteract the cost of transportation from known deposits and lead to further prospecting. In the meantime ferro-manganese is offered for New York delivery in the first three months of next year at \$78.50. This is equal to \$81 at Pittsburgh.

A Train-Caller's Gibberish.

The Philadelphia *Record* says that at the Broad street station in that city "Aw bor, bin thar, poly an' wa-y stations," means "for Bryn Mawr, Paoli and way stations;" "Boo wa, wa hash borg, pitch an' wes," means "train for

The Brotherhood of Railway Trainmen. The convention of the Brotherhood of Railway Brakemen at St. Paul changed its name to the "Brotherhood of Railway Trainmen," and the next place of meeting was fixed at Los Angeles, Cal.

Harrisburg, Pittsburg and the West," and "Bor hash—pitch—toona and chic ar—" means Harrisburg, Pittsburg, Altoona, Chicago and the West. It appears that passengers unfamiliar with the locality often get the idea, from the frequent use of the word "pitch," that the railroad company is in league with some baseball combination, the sound being frequently as near like pitcher as pitch; while "hash pitcher" conveys the impression that the useful article of crockery here suggested is one of the chief implements used by the waiters in the superb dining cars of the "P. R. R."

Not so Singular as it Seems.

By a singular coincidence the 7 foot weeds which have infested the J., M. & L. stations in this city all summer were cut down and carted away about an hour previous to the inspection tour made by the President of the Pennsylvania lines.—*New Albany Truth Teller.*

A Large "Dummy."

The word "dummy" is applied with more or less accuracy to various kinds of locomotives, but what we refer to here is a real "dummy"—that is, an engine that is not an engine. It is a full-sized model recently built by the Union Pacific, and exhibited in street parades at Omaha, Sept. 5; Lincoln, Sept. 12; Sioux City, Sept. 25, and Kansas City, Oct. 1. We have been shown a photograph of the exhibit, which must have been quite effective, though there are some deficiencies which the spectator, dazzled by red fire was doubtless expected to indulgently overlook. A local paper gives the following description:

The Union Pacific had in the procession a full-sized model of a passenger locomotive and a freight car. The length of the engine and car was 70 ft. The engine had a genuine pilot, headlight, smokestack, bell, sand box and whistle. It had also two pairs of driving wheels, which were joined by the connecting rods with the cylinders in the usual manner, and as the engine moved along the wheels revolved in realistic style. The headlight was brilliant, and with the bell ringing, whistle blowing, and thick black clouds of smoke issuing from the stack, to one uninitiated, it seemed that the "Overland Route" had taken one of its passenger engines and placed it upon the street. The engineer and fireman were in their places in the cab, and the entire apparatus was handled by them. On the front of the engine were placed green lights, and the name of it was "The Overland Flyer, No. 1."

Car No. 99,999 was a fac-simile of a Union Pacific freight car, with brake wheels, draw bars and red tail lights. On the outside of the car and the tender of the engine were numerous inscriptions, reciting the advantages offered by the Union Pacific. These inscriptions were brought out prominently, as the car was brilliantly illuminated by red fire.

The "General."

It seems that the historic locomotive "General" has been sold to the Empire & Dublin road for use on a construction train, and an exchange seizes the opportunity to again recount its exploit as follows: It was the old "General" which figured in "Anderson's raid," a brief sketch of which is as follows: One day in 1863 a train from Atlanta stopped at Big Shanty. This engine was attached to it. While the conductor and all the trainmen were in the dining car, Captain Anderson, a Federal officer, with several men boarded the engine, detached it from the train, and ran off with it toward Chattanooga. Captain Anderson's intention was to tear up the track and burn all the bridges on the Western & Atlantic road between Atlanta and Chattanooga, so as to deprive the Tennessee Confederates of communication with Atlanta. After a run of about 40 miles the fuel gave out. After ten further the steam gave out, and as the conductor, Captain Fuller, was close upon the party with another engine, Captain Anderson and his men took to the woods. All but three were captured and taken to Atlanta and hanged as spies. Anderson was among the number. That was 26 years ago, and the engine has been in use at times ever since, although it has been several times repaired.

Calls on Railroad Officers.

A very convenient arrangement for callers is in operation in many of the railroad offices in France. The visitor is ushered into a well-furnished, well-lighted room, provided with the current periodicals. After being seated, the uniformed attendant hands him a card with a blank line for his name, followed by the line "Subject of the call," and space for writing. This he fills out, often receiving his reply on the same slip when an interview is unnecessary. This is a most convenient system, because one needs not to wait for other visitors who may be in attendance, but immediately upon the presentation of the card to the officer he desires to see he receives a reply, making an appointment, declining one or giving the desired information. The necessity of long intervals of waiting before obtaining audience with railroad officers for small matters is in this way avoided. Of course, this plan is far from unknown in this country, but it might be more commonly used with advantage.

Shipbuilding on the Lakes.

The Cleveland papers report that there will be great activity in the Lake shipyards this winter. The probability that over 7,000,000 tons of iron ore will be brought down and sold this season has, notwithstanding some 60 vessels have been launched within a year, led to the placing of contracts for 35 vessels, measuring in all 67,330 tons, and costing \$4,653,800. It is expected that six more will be contracted for in the near future. Of this fleet only three are sail vessels; there are 14 steel steamers, the same number of wood and one composite steamer; two of the tugs are of steel, built at Duluth, with turtle-backed decks and no masts. Nine of the steel steamers are building at Cleveland, two at Bay City, and one each at Buffalo, Toledo and Detroit. Most of the wooden steamers are being built at Bay City. The Lake marine work is understood to have improved nearly as much in quality as in quantity, the models being better and the speed and strength greater. Mr. F. D. Wheeler, of Bay City, the Scripps League shipbuilding expert, compares a Laker with an A1 Lloyd's built in Scotland: the American vessel being 300 ft against 290 ft. long for the Scotch, 2 ft. wider and 1 ft. shallower. The scantlings are generally $\frac{1}{2}$ in. larger in the American; there are five bulkheads instead of three. The bottom tank is 40 ft. longer and the plates average $\frac{1}{8}$ in. thicker, the weights being 1,450 and 1,200 tons. The contract price for the American was \$275,000 and for the Scotch \$150,000, or for an increase of 20 per cent. in weight there is an increase of 83 per cent. in cost. Our builders have always contended that they did better work here than on the Clyde, and produce a much stancher and more seaworthy vessel. They evidently use more material.

TECHNICAL.

Rack Railroad on Pike's Peak.

The company formed to build this road includes representatives of almost all the railroads reaching that part of Colorado. The capital is \$500,000. Maj. John Hulbert, of Colorado Springs, is President; President Cable, of

the Rock Island, Vice-President, and Chief Engineer R. E. Briggs, of the Denver & Rio Grande, Chief Engineer. The total altitude surmounted by the road will be nearly 8,000 ft., and the heaviest grade about one in four. It will be built on the Abt system, and a 40-ton locomotive is now being built for it by the Baldwin Locomotive Works. The upper end of the line will be at the point long occupied by the United States Government for the signal station, near the crest of the eastern face of the summit.

Car-Lighting Notes.

We have recently made note of the extensive preparations making by various roads to introduce the Pintsch gas. The Pennsylvania Railroad and allied lines are rapidly equipping their passenger stock with the dry-carburetter system. Meanwhile the manufacturers of oil lamps have not been indifferent to the growing demand for better illumination. An instance of the improvement in the design of these lamps may be seen in those used in the dining cars of the Michigan Central and those of the suburban trains of the Chicago, Burlington & Quincy. Both of these lamps furnish a brilliant and satisfactory light.

Compound Locomotive for the B. & O.

The compound engine built for the Baltimore & Ohio by the Baldwin Locomotive Works has been delivered. As we have stated before, it is a four-cylinder engine, and it is said that it will be put on the run between Philadelphia and Baltimore.

The Cairo Bridge.

The Illinois Central's Bridge at Cairo was tested Oct. 29. Nine mogul engines were sent across, followed by the special trains bearing officials of the road and invited guests. The first regular train, consisting of an engine, three coaches and baggage and express cars, crossed the bridge an hour later bound for New Orleans.

The Winner Bridge.

A small force of men has been at work for some days, building the caissons of this bridge at Kansas City, Mo. A good deal of material for the structure has been delivered on the ground. The contracts for the superstructure was secured by the Keystone Bridge Co., of Pittsburgh.

The Louisville & Jeffersonville Bridge.

It is said that the plans for this bridge have been accepted by the Secretary of War, and there is no longer any question of its going ahead. The piers are to be 550 ft. apart, and the bridge will be 1,650 ft. long between the shore piers. The total length, including approaches, will be 8,800 ft. The clearance over the channel is 53 ft. above high water. Mr. P. C. Randolph, who was superintendent of construction of the Chesapeake & Ohio bridge at Cincinnati, has been appointed superintendent of this bridge. We stated last week that the contract for the bridge had been given to the Phoenix Bridge Co. and that Sooy-Smith & Co. have the contract for the substructure.

The 2,000-Ton Cruisers.

It will be recollected that the United States Navy Department recently solicited proposals for the building of three 2,000-ton cruisers, authorized by the act of Congress Sept. 7, 1888, and that the bids received were all in excess of the appropriation. The Secretary of the Navy immediately commenced to make arrangements for building the cruisers at navy yards, and also issued new proposals, in which the required speed was somewhat reduced, premiums being offered for any increase of speed over contract requirements. Bids were opened, Oct. 26, as follows:

	For one cruiser.	For two cruisers.	For three cruisers.
Union Iron Works, San Francisco	\$775,000	\$1,450,000	\$2,051,001
N. F. Palmer, Jr., & Co., New York	674,000	.....	.....
Columbian Iron Works, Baltimore	635,000	1,225,000	.....
Bath Iron Works, Bath, Maine	675,000	1,350,000	2,025,000
Harrison Laing, Boston	674,000	.....	.....

The contract requires that each cruiser shall have a speed of 17 knots an hour for four consecutive hours, with a penalty of \$25,000 for each quarter-knot below, and a premium of the same amount for each quarter-knot above the contract speed; and that a cruiser failing to make 16 knots an hour for four consecutive hours shall be rejected. Awards have been made of two cruisers to the Columbian Iron Works for \$1,225,000; and the contract for the third cruiser will be given either to N. F. Palmer & Co. or Harrison Laing, whose bids were the same. It is expected that one of these bidders will construct the hull, and the other the machinery.

The gunboat "Petrel," built by the Columbian Iron Works, has been accepted by the Secretary of the Navy at the contract price of \$243,000, less \$48,000 deducted as penalty for delay in completing the contract.

The accepted bids for the 2,000-ton cruisers are well within the appropriation, the sum of \$201,000 being left for equipment and the payment of premiums, if any are earned.

Electric Lighting.

The cost of all-night lighting by the arc lamp, each light rated at 2,000 candle power (nominal), varies in different cities of the United States from \$73 to \$240 yearly for each light. There does not seem to be any good reason for this variation, unless it is that electric lighting companies are in the habit of charging as much as they think they can obtain, independently of the cost.

Aluminum.

A diminution in the price of aluminum has lately been made by the Pittsburgh Reduction Company, which offers this useful metal at about half the former figures:

At \$2 per pound, in lots of 1,000 pounds.
At \$2.25 per pound, in lots of 500 pounds.
At \$2.50 per pound, in lots of 100 pounds.
At \$3 per pound, in lots of 50 pounds.
At \$4 per pound, in small lots less than 50 pounds.

Former quotations for aluminum have not been less than \$4 a pound for the largest orders.

Second-Hand Equipment.

Messrs. Reginald, Canning & Co., of New York, have taken a step in the right direction in systematizing the trade in second-hand locomotives and cars by issuing a "fall circular," giving a list and a tolerably complete description of 36 locomotives and a large number of cars, which they have on hand for sale. To inquirers they furnish blue prints and photographs. They report that "the business is very much improved and inquiries numerous."

Tests of the Thames River Bridge.

The Thames River Bridge was tested for deflection the Sunday before the formal opening. The eastern approach span showed a deflection of 2½ in. in the north truss and 2½ in. in the south truss, with full recovery. The deflection of the western span was 2½ in. in the north truss and 2½ in. in the south truss, with nearly complete recovery, lacking one-eighth of an inch in the north truss. The deflections of the draw-arm spans were 1½ in. and 2½ for the eastern arm, and 1½ and 1½ for the western arm, with complete recovery in all cases, except the south truss of the west arm, which lacked one-eighth of an inch of full recovery. The loads averaged from 500,000 to 588,000 lbs.

Launching a New Transfer Steamer.

The sidewheel transfer steamer "Maryland," built for the New York, New Haven & Hartford, to replace the vessel burned on the Harlem River some time ago, was launched from the Harlan & Hollingsworth Co.'s shipyard at Wilmington, Del., Oct. 23. The vessel will be almost entirely of iron, and her iron deck-house is already finished. The dimensions of the new vessel are: Length, 250 ft.; breadth, 65 ft.; depth of hold, 13 ft., 6 in. She will have two independent horizontal compound engines, with cylinders 34 and 44 in. diameter, and a stroke of piston of 9 ft.

Electric Motors for Erie's Collieries.

The New York, Lake Erie & Western has introduced electric motors in place of mules for traction purposes in its mines. An electric motor was set at work last week in the company's Hillsdale coal mine, near Forest City, Pa. It is stated that the motor will make the round trip from the coal breaks to the breaker in six minutes, hauling 30 cars. It required nine mules to draw the train at one-quarter the speed. By using the electric motor the company saves \$25 per day on the cost of power, and is enabled to increase the output of the mine from 1,000 to 1,500 tons per day.

The Eureka Steam Packing Cement.

This material is being used with much success as a packing cement for joints and seams on steam and gas pipes, heaters, radiators, blast furnaces, locomotive extension fronts and steam chests, etc., without the admixture of gum, copper, hemp, or red or white lead. It has been tested up to 200 lbs. per square inch without failure, and in hydraulic work to 470 lbs. with no leakage. Joints made with it nine years ago are found to be still tight. When this cement is mixed with Japan varnish it makes a good fire-proof paint, and is applicable to hot blast joints which are subject to 1,100 deg. of heat. The advantages claimed for it are about as follows: Steam can be turned on immediately after the joint is made; joints made of this material last as long as the iron, being invulnerable to heat; in the form of a solution it penetrates and stops all small leaks, especially in porous castings; it does not corrode iron, and it is equal in service to three times the same quantity of red lead. This packing is made by the Utley Manufacturing Co., Chicago, Ill., and is used on about 50 different railroads and in over 100 manufacturing concerns in the vicinity of Chicago. Mechanical officers of the Lake Shore & Michigan Southern, the Denver & Rio Grande, the Missouri Pacific, the Central Vermont and other roads speak highly of it for packing joints.

Phosphor Bronze Bearings.

The Pennsylvania Railroad is using large quantities of phosphor bronze bearing metal, and has found it to have characteristics which reduce the combined cost of replacing bearings and delays resulting from hot boxes. It has been a somewhat difficult matter to form a proper specification for the purchase of phosphor bronze bearing metal, and the result of the experiments upon the Pennsylvania to this end will be interesting to all. The following is a copy of specification for phosphor bronze bearing metal issued June 14, 1889, by Mr. Theodore N. Elg, General Superintendent of Motive Power:

From this date phosphor bronze bearing metal will be purchased in amounts of 20,000 lbs., or some whole multiple of this number. Manufacturers will be required to notify the General Superintendent of Motive Power at Altoona when they are ready to ship 20,000 lbs., and await the arrival of the company's inspector, and have proper assistance and all facilities ready for shipping the metal as soon as the inspector arrives. The inspector will see the metal weighed and shipped, and will select three half pigs to represent the shipment. He will also be at liberty to reject any pigs in which want of uniformity in the constituents is evident to the eye. Mixed borings from the three half pigs will be analyzed, and the shipment will be accepted or rejected on this analysis. The metal desired has the following composition:

Copper	79.70 per cent.
Tin	10.00 "
Lead	9.50 "
Phosphorus	0.80 "

Shipments will not be accepted if the analysis as above described gives results outside the following limits: Tin, below 9 per cent., or over 11 per cent.; lead, below 8 per cent., or over 11 per cent.; and phosphorus below 0.70 per cent., or over 1 per cent., nor if the metal contains a sum total of any other substances than copper, tin, lead and phosphorus in greater quantity than 0.50 per cent.

A Canadian Pacific Ferryboat.

The Polson Iron Works, of Toronto and Owen Sound, have contracted with the Canadian Pacific to construct a second ferry steamer for use on the Detroit River. The new boat will be 295 ft. long, and will be a duplicate of the one now nearly ready to be commissioned. The vessels will be used in transporting trains across the Detroit River between Windsor and Detroit.

Chignecto Marine Railway.

Work on this undertaking is being pushed forward rapidly. At the Tidnish end the cofferdam is nearly completed. Two hundred carloads of steel rails, weighing 110 lbs. to the yard, made in England, have been delivered. Also 40 engines of 190 h. p. each, and six steam boilers, each 27 ft. long by 9 ft. diameter.

The McLeod Car Heating System.

The McLeod Car Heating & Ventilating Co. has been organized in Boston with the following board of directors: John S. McLeod, Henry Hartley, George R. Brine, Col. Thomas R. Sharp, Joseph Symons. The officers are: John S. McLeod, President; George R. Brine, Vice-President; Henry Hartley, Treasurer and Secretary; Col. Thomas R. Sharp, General Manager; and Thomas Meehan, Superintendent of Equipment. Col. Sharp was formerly Receiver of the Long Island, and more recently General Manager of the Kanawha & Ohio. The apparatus has been fitted on a train of the Staten Island road and is almost ready for use. It is also to be tried on the Ohio River road, and on the Chattanooga Union. The company provides for the heating and ventilation of the cars by a circulation of air forced through a coil of pipes in the fire-box of the locomotive by pumps operated by steam from the boiler.



Published Every Friday,

At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

We have recently made note of the activity among locomotive builders, and have concluded from the incomplete data available that in the last few months more engines have been ordered than in the same period last year. It has for some time been evident that the railroad building would be considerably less than last year—probably 30 per cent. less—still it has also been evident that this would be a good crop year; and a heavy traffic, with increased earnings, for the great majority of the roads have warranted considerable expenditures for renewals and increase of equipment. Such reports as we now have from locomotive builders show that their business is still improving, but some of the works are filled with orders at prices which are not on the whole satisfactory. It is apparent that contracts in the immediate future will be let at increased rates. Some time since an effort was made to bring about a combination of locomotive builders, and thus increase prices; but this failed because of the non-concurrence of two or three builders. Now, as most of the works have a large quantity of orders ahead, higher prices will necessarily result, yet some express an opinion that the prosperous condition will not last long. The basis upon which the combination was suggested was a standard price for the different kinds of engines, rating them according to the cylinder dimensions, and without extras. There has been a day when such a basis as this for a combination would have been satisfactory; but at present many locomotives are built with 16-in. cylinders, notably one just built by the Chicago, Milwaukee & St. Paul, which weighed as much as some of the standard 18×24 in. of regular builders. Again, some of the 18×24 in. engines, such as those built for the New York, New Haven & Hartford by the Rhode Island Locomotive Works, weigh only as much as the standard 16×24 in. of regular builders. It is evident, therefore, that cylinder capacity would not answer as a basis for prices. If a basis of weight be assumed, a closer approximation to a satisfactory standard would be arrived at; but here, again, is a difficulty, because the various designs of locomotives are not uniform in complexity and would cost different amounts to build. However, it is possible by a properly arranged classification, including many conditions, to form a combination on a basis which would, if all builders could be made to stick to it, be satisfactory; but when one remembers the number of details of a locomotive which would have to be considered as extras, and the different kinds of these details, and the variations in their price, it must become evident that it would require the most conscientious action on the part of all builders not to take unfair advantages by quoting special rates on extras. Such action would offset the intention of the combination, and would in the end result in breaking it up. Combinations can only be successfully applied to increase the prices of those marketable products which are almost of identical character when made by different manufacturers. Such is not the case with locomotives, and hence the inevitable failure of an attempt at combination.

Probably more attention is being paid at present to the proper arrangement of draft rigging on freight cars than to any other detail of freight equipment. Some careful statistics have shown that on most roads more money is expended in repairs to the draft rigging than on any other detail of freight cars; and we have recently counted eight different designs of improved rigging which are being brought out for general sale, or being adopted as a standard by various railroads. Four of these designs were originated in the car departments of the railroads on which they are used. In each case there is an increased first cost and a considerable increase in strength. In one the resisting power of the draft spring has been increased 50 per cent. It is time that attention was paid to this matter, because with the advent of the Master Car Builders' standard coupler the draft rigging must take a larger proportion of the buffing blows than has been previously allotted to it. The Pennsylvania and other railroad companies use no dead blocks in connection with the Master Car Builders' coupler, and when they are used they are no protection to the draft rigging when cars come together with the knuckles closed. The horn on the coupler which brings up against the plate on the end sill serves as a protection to the draft gear; but not long after being in service it is observed that these horns, probably because of their limited area of bearing, drive the plate into the sill and allow the coupler to recede until the draft spring is closed full home, thus permitting, eventually, the most of the shock to be taken by the draft gear. Therefore, it is not unreasonable to believe, for the reasons before stated and because of the fact that the weight of freight cars is increasing without a corresponding increase in the care of handling, that the strains which draft rigging will have to resist in the future will be even greater than those now encountered. Therefore, the increased attention being devoted to this subject is one more step toward the ideal freight equipment.

Any one having much experience of the difficulties of boring wheels exactly in the centre cannot visit the car shops without being impressed with the inaccuracy of the methods of centring wheels in vogue. Personal experience has led us to believe that most of the older forms of car-wheel borers are liable, particularly when fitted with the ordinary three-jawed chucks, to bore wheels out of centre from $\frac{1}{32}$ to $\frac{1}{4}$ of an inch, and in some cases even more. In one case which comes to mind, reported difficulties with some truck wheels finally led to an investigation, and it was found that, unless extreme care was taken in setting the wheel, the car-wheel borer in use would bore as much as $\frac{1}{8}$ in. out of centre. One might suppose that the cored holes would indicate such a wide departure from the true centre, but too often it happens that the cores themselves are displaced, caused by careless work in closing the chills in the foundry. There are several car borers on the market that make a special feature of properly centring the wheel. Such borers will do good work; but the older forms cannot be expected to produce accurately centred wheels unless the utmost care is taken to keep them in adjustment. In measuring the accuracy of a car-wheel-borer chuck, one is liable to believe the chuck to be correct when it is not so. The three jaws may be at equal distances from the centre of the machine before the load is applied to the binding screws; but when a wheel is in position and the screws tightened up, the chucks may no longer be at equal distances. Therefore, it would seem that almost the only satisfactory way to determine the accuracy of the three-jawed chuck would be to place therein a wheel which had been turned to an exact circle and bored precisely true. The cutters then could be lowered into the axle fit, and by revolving the machine measurements could be made as to its accuracy. Of late, much attention has been paid to grinding wheels, and it is not uncommon to see wheels on the tread of which considerable more material had been removed from one side than from the other; and while grinding wheels may not decrease their mileage when they are properly centred on the axle, yet if too much material is taken from one side it is believed by several wheel makers that the mileage of the wheel may be considerably reduced. Grinding wheels will certainly make them true, but the knowledge of the possibilities of grinding should in nowise lead to a decrease in the care exercised in boring. The Chicago, Rock Island & Pacific has decided, after inspection of the mileage sheets of its car wheels, to do away with the process of grinding, having found that most wheels when ground, according to its system of grinding, are reduced in mileage about 20,000 miles. It is true that better chilled wheels are now being furnished railroad companies than ever before; but to obtain from them the mileage which their good qualities render possible, it is necessary that

they be not only carefully centred, if they are not to be ground, but even more carefully centred if they are to be ground.

Collarless axles have been in use under a locomotive tender, carrying about 3,600 gallons of water on eight wheels, for the Class H engine on the Chicago, Burlington & Quincy, without special bracing on the truck frames. The trucks are built without end cross bars, and in the usual manner for trucks intended to be used with axles having collars, and yet after running 33,000 miles in both passenger and freight service the end stops, the end of the axle and the inside collar of the axle show scarcely perceptible wear. As this is not generally the case with the ordinary axle with collars, in the same service, one may believe that no harm resulted from the use of collarless axles in trucks without special bracing. The trucks are in exactly as good condition as when first put out; that is, accurately square, and the bolts and rivet holes show the results of no unusual movements. From the results of these trials the Chicago, Burlington & Quincy people are led to believe that the use of collarless axles on ordinary trucks is worthy of further attention, and therefore they will now introduce them upon a new lot of furniture cars which they are building, with a view to further experiments. The axles above mentioned in use under tenders have never given trouble with heating, and have been, as far as can be seen, in every way as satisfactory as those with collars used on the same class of truck. It must be true that the ordinary truck used with collarless axles is slightly more flexible laterally than the same truck used with axles with collars; and may it not be that such flexibility is of advantage in reducing the intensity of the end thrust, and therefore the amount of end wear and liability of heating of the brasses? It sometimes seems as if in some of the arguments on this subject the whole truck was not taken into consideration when looking into the possible strains resulting from the use of collarless axles without special forms of truck. It is indisputable that one side of the truck frame must take the larger proportion of the side thrust; but is it not true also that there is little tendency to twist the frame out of shape because the bearings come on both wheels at about the same time? When one end of a truck strikes a curve, frog or lateral irregularity in the track, the tendency must be to twist the frame; but is there not in the ordinary truck sufficient flexibility to prevent a permanent change of rectangular form when such lateral corner thrusts are imposed?

In considering the most economical compression for locomotives, a contemporary says: "For economy of steam the pressure in the clearance space when the steam valve opens should be equal to the initial pressure." This statement is incorrect, and we feel it our duty to call attention to the error, because, particularly in locomotive engines, it is liable to lead to wrong impressions regarding the economy of such engines. It is incorrect, chiefly because of the three following reasons:

First: If the pressure in the clearance space of a locomotive engine is carried up to the boiler pressure, then the compression must be about eight times; that is, when allowing four pounds back pressure, eight times would bring the pressure in the clearance space up to 157 pounds. When this compressed steam is used, it will not, in general, be expanded eight times, and, therefore, some of the work is lost.

Second: In cylinders with large clearances, particularly in locomotive cylinders, when the compression is carried up to the boiler pressure, the area of the card is considerably reduced, and this reduction necessitates the use of larger cylinders than would otherwise be necessary to do a given amount of work. An increase in the cylinders is in nowise to be considered advantageous unless for other reasons than the mere raising of compression to boiler pressure. One of the most uneconomical results of high speed is the excessive compression, because by such compression the area of the indicator card is reduced so much that the power of a large cylinder at high speeds is reduced to equal that of a small one at lower speeds.

Third: The power used to compress steam in the clearance spaces is not wholly furnished by the expanding steam on the other side of the piston, but principally supplied from the stored energy in the moving parts of the machine, or by the power which the cylinder on the opposite side of the engine has generated. Therefore, the power used to compress steam in the clearance spaces is taken from that which has already been stored, with much loss due to friction and other causes, and hence it is an expensive power to use.

Careful investigation will show that there is with

any given cut-off and given engine a most economical degree of compression to use; but rarely, if ever, is this most economical compression equal to that of the boiler pressure, and generally falls considerably below. It is not uncommon to hear, with regard to locomotive engines, that the enormous increase in compression as the locomotive is "hooked up" is one of the blessings of the Stephenson link motion; but this is not true, and those who realize that the excessive compression considerably reduces the power of locomotives at high speeds and renders them less economical, for the three reasons given above, will not agree with such a statement.

The Time Interval Between Trains.

The rear collision at Palatine Bridge last month was the result of a combination of causes not often occurring in passenger service. This fact, added to the fatal results, makes the accident noteworthy and draws increased attention to the subject of block signaling. This is well. The block system is needed on thousands of miles of road in this country, and is practicable not only from a technical standpoint, but is financially possible in a slightly modified form on many roads which do not now have it.

But there are some roads which cannot afford to use this admirable safeguard, and there are certainly many that will not adopt it, whatever outsiders may think about their financial ability. For these a time interval is the next best protection; and where this is depended upon the least that a careful manager can do is to see that the interval is sufficiently long and is maintained as rigidly as possible. In practice this period varies from 15 minutes down to five, and is often squeezed down to three or two. These figures represent the time available for the brakeman of any delayed train to go back on foot for the purpose of stopping the train following him. The distance prescribed varies from half a mile to a mile, the most common being perhaps 3,600 feet, equal to about two-thirds of a mile. This is the distance specified in the Pennsylvania code, and we believe is the one approved by the committee of the Time Convention. Some roads amend the rule by a clause requiring the man to go further in case the train to be flagged is descending a grade.

It is important, in discussing this subject, to remember that the lives of passengers in passenger trains do not constitute the only consideration involved. The money loss from rear collisions in this country is great. Many passengers and other people than trainmen are constantly riding on freight trains. Even if stock drivers are carried under an agreement not to pay for personal injury, the company is still bound not to treat them negligently.

To assist in clearly showing the danger of a short interval and the necessity of providing a long one, we have prepared the following table, showing the distance from the forward train at which a flagman will meet a train following him, assuming that the foremost train stops instantly, and that the man starts the moment it stops. It is also assumed that the forward train is running at least as fast as the one following it. If the latter is running at all faster than the other there is, of course, no safety in any rule whatever except an absolute time table, by which the foremost train flags itself before it gets on the time of the other. These distances are to be increased by the number of feet the foremost train runs after its flagman has alighted; but, on the other hand, the time must be diminished by the amount lost in slackening from the running rate down to a speed at which the man can jump off. Where there are so many uncertainties we may well let one of these factors offset the other. On the Fall Brook Coal Co.'s road a brakeman is censured if he waits for the speed to get below eight miles per hour before he gets off. With that habit well fixed in the men's minds the safety of the flagging rule is greatly enhanced; on the other hand, if the engineer "drags," as was the case at Palatine Bridge, the danger point is soon reached.

	Trains 5 minutes apart.			Trains 10 minutes apart.		
	15	35	50	15	35	50
Speed of trains, miles per hour.....	22	51.3	73.3	22	51.3	73.3
Speed of trains, feet per second.....	6,600	15,400	22,000	13,200	30,800	44,000
Distance between trains, feet.....	1,100	1,216	1,245	2,200	2,432	2,490
Man traveling at 3 miles per hour, 4.39 ft. per second, will meet train in (feet).....	1,389	1,579	1,630	2,779	3,159	3,259
At 4 miles per hour, 5.79 ft. per second.....	1,886	2,254	2,357	3,771	4,508	4,714
At 6 miles per hour, 8.8 ft. per second.....						

Three miles an hour is a moderate pace, but when we consider the heat of summer, the snows of winter

which impede a man considerably, and the slippery condition of bridges in sleet storms, who will say that it is too low a basis for the present calculation? Six miles an hour can be assumed only for the most wide-awake sort of brakemen, and even at this rate we see that, with a five-minute interval, the man will not in any case cover half a mile. The four-mile rate represents a brisk pace, and is the rate often prescribed for the guidance of trains in flagging themselves over the road. It is certainly fast enough for our present purpose. Even with this, we come nowhere near allowing a half-mile leeway, unless we make the interval more than five minutes; and even with ten minutes we do not come up to the 3,600 ft. prescribed by many roads for placing the two torpedoes. A rule which cannot be enforced ought not to exist, says the Standard Code. Various other interesting suggestions from these figures will be apparent to the reader without our assistance. Add to these positive arguments the contingencies dependent upon men stopping to put on overcoats, to clear up their doubts as to the cause of stoppage, to overcome their natural laziness, and a dozen other things, and the only fair question concerning a ten-minute interval is not, May it safely be reduced? but rather, Can we safely hesitate to enlarge it? It is true that in ninety-nine cases the weather is clear, the track is straight and the runner sees the signal a long time before he reaches it, but it is the hundredth time that has to be provided for. It is also true that roads prescribing a five-minute interval require stationmen to exhibit a caution signal from the sixth to the tenth minute, inclusive; but with all the known contingencies connected with the working of a locomotive runner's brain, who will say that it is expedient to have trains running "under control" a large share of the time?

How to preserve a proper interval after it is prescribed is a more difficult task, and if we were to discuss it here we should simply be repeating what has been laid down in these columns over and over. It may be said in brief, however, that the time indicator, by which the stationman shows enginemen the hour and minute at which the preceding train passed, is very generally approved by those who use it, and its use has been increasing of late years. Its proper maintenance requires strict discipline, however. The Fall Brook Coal Co. is still using with great satisfaction the automatic time indicator for this purpose noticed in the *Railroad Gazette* of Jan. 11 last. This instrument has the advantage of being available at any point between stations, and it can make no mistakes. The fusee is the only signal available for a brakeman where his engineman slackens enough to involve danger, and yet not enough to make it safe for the brakeman to alight; and theoretically it is a perfect protection, but it is quite costly, and most superintendents hesitate to introduce it. Fusees are of doubtful value unless a brakeman can use them freely whenever he finds himself losing time, and to use them on this basis might involve the expenditure of an appreciable share of the earnings of half the trains on the road.

Last, but not least, all trains should be required to run, everywhere and always, at such a rate that they can be stopped within a specified distance, say half a mile for all trains; and the men should be frequently tested to see that they respect the rule.

The Railroad Clubs and the Civil Engineers.

The letter on another page, which describes a meeting in Berlin of the Verein für Eisenbahnkunde, again brings to mind a matter suggested by Mr. Lauder at the first fall meeting of the New England Railroad Club; that is, the fact that the railroad clubs which meet monthly are almost entirely made up of officers of the machinery and car departments, and their discussions are confined to the design, construction and maintenance of cars and locomotives, with rare excursions into the interchange rules. The civil engineering departments are almost entirely unrepresented in the membership or meetings. This is unfortunate all around—for the clubs, for the civil engineers and for the railroads. Certainly these clubs furnish a field where the technical officers of the roads might meet on common ground with mutual profit. There are many matters in which their interests touch each other. Bridge engineers, for instance, and maintenance of way engineers might tell master mechanics something about the effects of improperly balanced engines. Engineers in charge of buildings, as well as master mechanics, are interested in roundhouse roofs and in the design, heating and ventilating of shops. Maintenance of way engineers have a great interest in the condition of driving-wheel tires and of wheel treads and flanges. The life of machinery depends a good deal upon the track on which it runs, both as to line and surface and as to character of ballast.

As it is we knew of no body meeting frequently which discusses publicly, and as a special feature of its transactions, questions pertaining to the structures and permanent way of railroads. The association of maintenance of way engineers of the Pennsylvania Railroad meets, we believe, every month, but, unfortunately, its discussions are not published. The American Society and the various other engineering societies take up occasionally questions of railroad engineering; but any one who looks over the tables of contents of their published transactions for the last two or three years will be surprised to see how seldom such questions are treated by them, considering how many of their members are employed on railroads. When a topic of particular interest to railroad engineers is taken up, it is usually but one paper and but little discussed, if at all. Once in a while an attempt is made to treat such a topic exhaustively. For instance, last year a committee of the American Society undertook to investigate the relations of rail and wheel sections. But little record of discussion of the subject was to be found outside of the pages of the *Railroad Gazette* and of one or two foreign journals. The committee had to try to call out the opinions of members of the society by circulars, and succeeded in getting quite a number of replies, but no general expression of the opinions of the great body of the railroad engineers. We do not say that the final result was unsatisfactory. On the contrary, it was in the main precisely what we had wished; but the discussion of the subject was limited, and it is highly likely that the recommendations of the committee would have been more generally adopted had railroad men talked the matter over more. They might have talked the matter over more, and probably would have done so, had groups of them been in the habit of meeting frequently at convenient places for the express purpose of discussing professional topics.

This is exactly what the members of the various railroad clubs are now doing constantly, and one very important result of their meetings is that now, when matters are brought up at the conventions of the Car Builders' and Master Mechanics' Associations, it is found that they have been very thoroughly considered by the members during the year, and opinions are well digested and well known. It is such service as this that, we suggest, might be rendered by the clubs to other branches of the railroad service. If they can add to their membership a considerable number of permanent way engineers, they will not only get an interesting variety in their proceedings, but will increase the debt which the railroads already owe to them. Perhaps, however, it may be thought undesirable to divert much of the time and attention of the clubs from the line of topics which now so largely occupy them. Possibly it would be better to organize new clubs made up entirely of a different class of men. If the civil engineers do not care to spend their time listening to discussions on journal boxes and exhaust nozzles, and if the rolling-stock men are willing to leave the rail-joint problem entirely to others, why should there not be clubs of maintenance of way engineers and engineers of bridges and buildings, organized to meet each month in three or four of the more important railroad centres? The experiment would not cost much.

Tendencies in Railroad Consolidation.

In itself the combination between the Northwestern and the Union Pacific is not so important as some people would have us believe. It is not likely to precipitate wars with rival systems. It may possibly hasten the consolidation of other lines; but in so doing it will simply give a little more impetus to tendencies which already exist. Instead of being a startling fact, it is in harmony with the progress of events all over the country.

It is this which gives it its importance. It does not stand alone, but is a significant event in general railroad history, and must be looked at as such. It marks the passage into a new period of railroad development. If we look back 20 years to the time when the Union Pacific was first put in operation, we find that the Missouri River formed a sharp dividing line between the systems east and west. Three rival lines ran from Omaha to Chicago, the Northwestern, the Rock Island and the Burlington. An equal division of through traffic was arranged between these routes in 1870. It was probably the first pool which operated in this country on so large a scale. It did its work well, and survived the Granger legislation and the commercial crisis of 1873-78 without serious disturbance. The building of new lines from the East to the Missouri River made the problem of distribution more complicated, but did not change the method of treatment. The "five-

fingered pool" for business from Missouri River points south of Omaha was the occasion of much friction between competing interests, but was recognized by them all as being the most available form in which their rivalries could be adjusted.

This state of things lasted without serious change until 1882, and was not wholly overthrown till 1887. It was destroyed by the natural tendency of railroads to extend their lines across the Missouri River. The old Wabash-Missouri Pacific combination began this process; it was carried out to a still greater degree by the Burlington, the Rock Island and the Atchison, not to speak of other lines farther north. This rendered a continuance of the old state of things impossible. As long as the Union Pacific was the only line west of Omaha, it could divide its freight equally between three or more eastern connections; but when one of these connections built a western line of its own, and attempted to handle all its own freight and a part of the Union Pacific's, a change of method became necessary.

It was for a long time uncertain what form this change would take. The most natural idea was to extend the area covered by pooling contracts. If the district between Chicago and the Missouri River could no longer be treated as an independent unit, many people thought that harmony could be preserved by dividing the traffic on both sides of the river under a more comprehensive scheme. What would have been the fate of such efforts, apart from the prohibitory clause of the Interstate Commerce Law, it is impossible to say. It is certain that, under the operation of that law, they have been far from successful. As a general rule, the wider the work they undertook, the less they accomplished. The climax was reached in the Interstate Commerce Railway Association, which undertook almost everything and accomplished practically nothing.

While these attempts to solve the difficulty were proving useless, another set of attempts proved worse than useless. Systems were extended across the Missouri River with a view to their fighting power rather than to their earning power. Each board of directors feared to be left behind in this race for supremacy. If they could not buy a connection on terms which suited them they built one. It was usually cheaper to build than to buy; and the directors therefore built recklessly, forgetting that one of two parallel roads is worth very much less than a single road standing alone which was arranged to meet the wants of traffic. The evil results in the form of railroad duplication are only too well known. While the railroads which have been the worst sinners have also been the greatest sufferers, they have involved others to some extent in their own trouble.

Under these circumstances a closer combination of connecting lines was inevitable. The roads of a single district could not act independently. Extensive pools or traffic associations were too weak to accomplish their object. The building of new lines was financially disastrous. No alternative remained but to make close traffic agreements with connections, if not actually to consolidate with them. The tripartite agreement between the Union Pacific, the Northwestern and the Rock Island foreshadowed the present policy; the new contract between the Union Pacific and the Northwestern alone marks its fuller development.

The short-haul clause has combined with the pooling clause of the Interstate Commerce Act to hasten this consummation. The longer a railroad system is, the more freedom it has in the adjustment of through rates; and where through and local rates are so closely interdependent as they now are, this becomes a point of greater importance than ever. The difficulty of settling the question about prorating on St. Paul business indicates some of the disadvantages to which separate lines are subject. President Adams has constantly said that the result of the act must be in the direction of greater consolidation; he is now giving effect to his words. Nor is such a result confined to any one quarter. The rumored control of the Alton in the Vanderbilt interest and other reports of a similar character are not well confirmed, but it is hardly possible that all should be untrue. It seems obvious that the necessities of commercial policy are driving railroads toward consolidation on longer lines than the necessities of traffic organization would demand or even justify.

Nearly all students of the railroad question have agreed with Mr. Adams in expecting a great deal of railroad consolidation; but until the last few months most of them have looked for the consolidation of competing lines rather than connecting ones. The latter process seemed to have reached a natural limit a number of years ago; and the systems which overstepped that limit lost more than they gained. The events of to-day are putting a different face upon the whole matter. The question of pools and trusts is, for the

moment at any rate, thrown into the shade. The plan of organization by districts seems to give place to organization of long and closely combined through routes. How far this process will go no one can as yet pretend to tell.

September Accidents.

Our record of train accidents in September, given in this number, includes 71 collisions, 59 derailments and 2 other accidents; a total of 132 accidents, in which 48 persons were killed and 162 injured.

These accidents are classified as follows:

COLLISIONS:	
Rear.....	26
Butting.....	31
Crossing and miscellaneous.....	14
DERAILMENTS:	
Loose or spread rail.....	1
Broken bridge or trestle.....	3
Defective frog.....	1
Broken axle.....	3
Broken truck.....	1
Broken draw bar.....	1
Misplaced switch.....	7
Runaway cars.....	4
Cattle on track.....	6
Landslide.....	2
Malicious obstruction.....	3
Unexplained.....	24
OTHER ACCIDENTS:	
Broken axle.....	1
Careless handling of derrick.....	1
Total number of accidents.....	132

The causes of collisions, where given, were as follows:

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two.....	9	..	..	9
Misplaced switch.....	3	5	..	8
Failure to give or observe signal.....	6	..	1	7
Mistake in giving or understanding orders.....	..	5	..	5
Miscellaneous.....	3	6	3	12
Unexplained.....	5	15	10	30
Total.....	26	31	14	71

A general classification shows:

	Col- lisions.	Derail- ments.	Other.	Total.	P. c.
Defects of road.....	8	..	..	8	6
Defects of equipment.....	9	5	1	15	12
Negligence in operating.....	31	11	..	42	32
Unforeseen obstructions.....	1	11	1	13	10
Unexplained.....	30	21	..	51	40
Total.....	71	59	2	132	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Passenger.....	30	20	1	51	27
Freight and other.....	100	39	1	140	73
Total.....	130	59	2	191	100

The casualties may be divided as follows:

	Col- lisions.	Derail- ments.	Other.	Total.	P. c.
KILLED.					
Employes.....	17	9	..	26	57
Passengers.....	13	5	..	18	39
Others.....	2	..	..	2	4
Total.....	32	14	..	46	100
INJURED.					
Employes.....	39	38	..	77	48
Passengers.....	53	27	3	83	51
Others.....	2	..	..	2	1
Total.....	94	65	3	162	100

The casualties to passengers and employes, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road.....	3	18	1	4
Defects of equipment.....	13	62	17	48
Negligence in operating.....	..	..	7	19
Unforeseen obstructions and maliciousness.....	2	3	1	6
Unexplained.....	..	..	..	..
Total.....	18	83	26	77

Thirty-two accidents caused the death of one or more persons, and 31 caused injury but not death, leaving 63 (52 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with September, 1888 and 1887 shows:

	1889.	1888.	1887.
Rear collisions.....	26	35	37
Butting.....	31	21	43
Crossing and other collisions.....	14	12	3
Derailments.....	59	57	63
Other accidents.....	2	3	4
Total.....	132	128	150
Employes killed.....	26	29	32
Others.....	20	17	9
Employes injured.....	77	65	131
Others.....	85	158	60
Passenger trains involved.....	51	42	66

Average per day:

Accidents.....	4.40	4.20	5.00
Killed.....	1.53	1.10	2.03
Injured.....	5.40	7.40	6.37

Average per accident:

Killed.....	0.348	0.360	0.407
Injured.....	1.227	1.742	1.237

Passengers in passenger cars were killed in four accidents this month, viz., Auburn Park, six persons; Palatine Bridge, four; Leo, Kan., three; Tioga, Pa., one. Three other accidents involved the death of passengers, but they were drivers or other persons riding in cabooses. The Auburn Park collision was the result of employing a liquor-drinking engineer, as stated in the *Railroad Gazette* of Oct. 18. The coroner's jury in this case censured the railroad company for not enforcing its rules, and the conductor and brakeman of the passenger train for not leaving a red light on the rear of the detached car. It does not appear, however, that such a light would have done any good. An incident of the trial was the testimony of a division superintendent,

who, according to the report, "knew of no railroad which had its men examined for color blindness." We can hardly credit this statement. The intoxicated engineer had been employed 20 years, and was 41 years old. After having been discharged from the Rock Island, some time ago, he was employed on another Chicago road. This is discreditable both to that road's reputation for care in selecting men and to the Brotherhood of Locomotive Engineers, which claims to protect railroads against drinking men. It has been said in connection with this collision that, with nothing but a watch in the engineer's pocket as a safeguard, even sober engineers will sometimes get ahead of time and thus run into danger. It is true that trains are often run several minutes ahead of time, especially on roads where the superintendent does not watch his trains very closely; and the death of a director of the Santa Fe system occurred in a collision of this sort at Lorenzo, Ill., April 10 last; but it may be questioned whether any engineer who has worked on a run for a month ever gets much ahead of time without fully knowing just what he is about. However this may be, the fact remains that the conductor is equally responsible with the engineer for controlling speed, or at least for keeping it within the bounds of safety, and on that consideration the conductor at Auburn Park should have been on the alert sufficiently to check his engineer.

The Palatine Bridge collision has been the subject of several hearings before the New York Railroad Commissioners, but no decision from that board has yet been reported. The only testimony of consequence that we have seen is concerning the time that the train passed Yosts, and the reading of the time indicators at this station, concerning which the engineer and fireman disagree with the station man to the extent of nine minutes. The coroner's jury at Canajoharie censured the railroad company for gross negligence in running the trains too close together, but held the employes entirely free from blame. The testimony concerning the distance which the brakeman of the forward train got back is rather inconclusive, but it seems to show that he went perhaps 1,200 or 1,500 ft., thus indicating either a poor lookout or an inefficient brake. The conductor of the second section estimated his speed at 40 miles an hour, reduced to 15 at the time of the collision. The forward train ran four miles after the trouble with the steam chest was discovered. Some points in connection with this collision, as well as one brought out by a collision at Bowersdown, O., on the 30th, are discussed in another column.

The collision on the Boston & Maine, the 21st, was discussed in these columns Oct. 11. An exciting runaway wherein a train covered 16 miles without any one upon it will be found under date of the 3d, and a collision attributed to a slow watch on the 2d. A grade crossing collision on the 3d, attributed to fog, is a reminder of the great multitude of crossings used by thousands of trains every day where there are no distant signals and often no fixed signals of any kind. Half a dozen of the wrecks this month took fire, and in some of them the destruction from this cause was a big item. The dates of these were 10th, 12th, 13th, 16th, 25th. A passenger engine of the New York Central in New York City had its headlight knocked off by an explosion of gas Sept. 20. The gas escaped from a street main which was broken by a freshet caused by a cloudburst, and the fire in the locomotive fire-box ignited it. Two or three of the accident reports this month were accompanied in local papers by editorial commendation of the conduct of superintendents in giving full and fair accounts of what happened. At Chattanooga, Sept. 20, a woman was killed by leaping from an electric car, which got away from its custodian and ran down a steep hill. A passenger train in Mexico was overturned while going on to a side track one night, and had to wait 24 hours for a relief train. The passengers were two days late in reaching the City of Mexico, having been very short of food meanwhile.

American Industrial Concerns in the English Market.

The public press has made frequent mention of rumored purchases by English capitalists of leading manufacturing concerns throughout the United States. Serious misapprehensions of the object of these investments are shown in many of the notices referred to. The American public has been led to believe that a close corporation of moneyed men in England is engaged in an effort to monopolize the manufacturing activities of this country. Nothing could be further from the truth than such an impression. The fact is that all the operations which have been conducted are simply in the line of legitimate joint stock enterprise, in accordance with English usages. While in America railroad stocks are almost the only form of corporate undertaking with which the stock exchanges are acquainted, in England the principle of company organization has been carried much further, and it is customary for the public to deal in shares of companies formed for almost all sorts of commercial activity. Public companies are current at the stock exchange formed for financial, shipping, agricultural, manufacturing and many other forms of commercial undertaking. The English limited liability act gives perfect freedom of operation in company form with the limitation of the liability of shareholders simply to the amount which they put in.

In the application of this principle to American indus-

trial undertakings, the basis of company formation has been that concerns in actual operation in this country, when viewed by the light of experience of several years, justify the expectation of average profit satisfactory to an ordinary investor. It is not improbable that the American public would arrive at the same conclusion if the safeguards attaching to corporate management under the American law were as efficient as under the English law.

In the transfers which have been completed, of American concerns to English proprietorship, the price paid has for the most part been predicated on the working results of an average of five years. Such results have been authenticated by examination by professional accountants of reputation sent out from England. Generally speaking, the purchase price has been adjusted to about seven or eight times the average annual income; that is, at a price yielding from 12 to 14 per cent., according to past experience. At first glance, it may seem that such a basis of capitalization hardly presents inducement to the owners of a well-founded business in America to part with it, but such establishments in the hands of capable owners have generally yielded from 20 to 25 per cent. on the actual cash invested. It will be seen that a capitalization even at 14 per cent. will leave a large proportion of the purchase money really paid as an equivalent for good will and reputation. In this country the conditions of competition are so keen that the public is disposed to attach little value to the good will of any business unless protected by patent or some condition of monopoly, so that when our English cousins are disposed to place a considerable money value on the established reputation of an industrial concern, the owners have been in many cases quick to take the opportunity to realize.

But in many cases more legitimate influences have led to the sale of concerns, or their reorganization, as perhaps it should be more properly called. The history of the development of large American manufacturing establishments has for the most part been that each year has seen the necessity of enlarged plant, and profits made in the business are constantly put back again into increased establishments. The owners find at the end of a long period of successful business that their nominal profits are represented really not by cash in hand, but by enormously increased establishments. In the case of dissolution of partnership by death or otherwise, it becomes difficult to convert such large investments into cash, and owners who are inclined to contemplate the situation which might be created by their death are confronted with the dilemma that it would be equally difficult for their successors to operate the works or to sell them. This dilemma is solved for many proprietors by the opportunities which have been recently presented to convert the organization into an English limited liability company.

The English corporation issues three classes of securities—debentures or bonds, preferred stock, and common stock, the bonds bearing six per cent., the preferred stock eight per cent. (constituting the total fixed charge), and the common stock being entitled to the reversion, which, by reason of the diminished rate on two-thirds of the capital, results in promising 15 or 16 per cent. on the ordinary shares. The existing managers in America are engaged by contract for three or five years to continue in the management and give an opportunity to train a competent staff for succession to the management. The American owners are required to take one-third of their purchase money in the respective securities of the English corporation, and so long as the management continues in the paths which have created the reputation of the concern, the American staff may feel that they are just as securely in control as if they owned the other two-thirds of the capital, since English holders are accustomed to support by their proxies the representatives to whom they confide the management of their interests.

The three classes of securities above described appeal to three different classes of investors among the English public, the bonds affording a well-guarded investment for the non-speculative holder, the preferred stock a semi-speculative holding, and the ordinary stock compensating by its high interest for the risks which must necessarily attend commercial undertakings. A thorough understanding by the American public of this form of investment, and an opportunity presented to them to embark in it, may in time lead to a participation by the public on this side in the ownership of industrial companies formed in England. It certainly is generally conceded that a wider range of selection than is now afforded at our stock exchanges might be presented to the public with advantage.

As illustrative of the general methods above described, a few facts may be given from the prospectus of the Otis Steel Company, of Cleveland, which on July 13 last was launched in London under the auspices of the Trustees, Executors and Securities Insurance Corporation, Ltd. The capital of the company was made up of £300,000 first-mortgage six per cent. bonds, £300,000 eight per cent. preference shares, and £300,000 ordinary shares. Messrs. Deloitte, Dever, Griffiths & Co., accountants, of London, certified that the average net profits for ten years were £112,025 per annum. Messrs. J & P. Hickson, engineers, of Manchester, certified to the physical condition of the works. The above income, it will be seen, was sufficient, as stated in the prospectus,

to pay the fixed charges and leave a net revenue equal to 20 per cent. on the ordinary shares. The sellers of the property received one-third of the purchase money, made up of equal proportions of shares and bonds, in addition to the cash payment under the contract.

The successful launching of the London & New York Investment Corporation which we chronicled last week, probably means that this form of investment by Englishmen in American industries is likely to increase rather than to diminish; and it offers a convenient means for the American public to participate in such investments.

Boiler Making.

At the recent meeting of the American Boiler Manufacturers' Association the subject of the proper dimensions of manholes and the most suitable material for manhole rings was discussed. There were two reports; one recommended that all manhole openings be made in the heads of boilers 10×16 in., and for drums and fronts of tubular boilers an opening of 9×15 in. In some localities it has been customary to use 11×15 in.; but these dimensions are rather small for medium size men. Various theories as to the weak and strong points of shells, heads, reinforcements, etc., were advanced. The experts, however, rather agreed that experiments were necessary to definitely settle the question involved.

A motion was offered and carried that it was the sense of the convention that manholes should be stiffened by some malleable material, that cast iron be discarded entirely, and that all holes in boilers be re-enforced by any good malleable material which would make the head or the shell as strong as it was before the hole was made. In this feature of boiler construction, locomotive boiler builders are ahead of stationary boiler builders. They are using only wrought-iron rings for domes and other openings. It is true, however, that in many cases the rings are not made heavy enough to preserve the form of the boiler under pressure, and it is not uncommon to see leakage around boiler domes as the result of the movement of the boiler at that point, thus indicating that the retaining rings are not equal to the work imposed upon them. The rejection of cast iron as a stiffening material for openings in boilers is a step in the right direction, and the substitution therefor of either wrought iron or steel will remove some of the difficulties experienced heretofore, provided the rings are made of sufficient section.

The report of the committee on riveting and caulking is rather surprising, and might indicate that the committee had not had experience with first-class, power-riveted work. There is no question among the better class of marine, locomotive, and stationary engineers regarding the comparative value of machine and hand riveting when both are well done. Poor machine work is no worse than poor hand work, but as an inferior class of labor is generally employed in manipulating the riveting machines, inferior work is more liable to be had. It is simply impossible to make large rivets completely fill what may be called irregular holes—and such holes will sometimes happen in the best of shops—by hand riveting; but power machines can easily accomplish this. Most of those constructors who object to riveting machines do so on the ground that the rivets spread between the sheets and that the sheets are injured by the heavy blows during the process of riveting. Now these objections are not tenable unless where the work is improperly fitted or where the rivets are too short for the dies or the dies too deep for the rivets. Under these conditions one may expect to find the rivets having a fin between the sheets and marks, or indentations around the head of the rivet, caused by the dies of the machine; but such is not good machine work, and should in no case be considered as representing the average character of machine-riveted work; it is rather the result of careless fitting and manipulation, as well as of ignorance regarding the proper operation of a power riveter. There is no machine at present in use in boiler shops which so much decreases the labor incident to boiler construction, or enhances the safety of the boilers when in use, to such a degree as the power riveter, but, like every other good and serviceable tool, it must be properly used, it having no brains of its own to supply those lacking in the heads of its manipulators.

Opinions as to the proper method of caulking boilers are very diverse. One maker will have a boiler caulked with a square-nosed tool, another with a tool having a semi-circular end and a third caulk inside and out; while on some English railroads—notably the London, Brighton & South Coast, in charge of Mr. Stroudley—the locomotive boilers are first carefully fitted up, and then a small caulking tool is driven with a light hammer on to the very edge of the sheet, leaving a mark only about a thirty-second of an inch in width. The caulking is carefully inspected in those shops to see if a large amount of it was necessary in order to make a tight joint, it being considered good work that requires but little caulking. The committee on riveting and caulking was continued, and it is to be hoped that a more comprehensive report will be made at the next meeting.

Under the head of punched vs. drilled holes for boilers, the reports stated that punched holes are considered better than drilled. Just in what sense better is not clearly stated; but it may be assumed that it was intended to mean that the sheets were stronger if punched than if drilled. Careful experiments made to determine

this point beyond question have not been altogether unanimous in their results. In some cases, strips of iron punched have been stronger than similar pieces drilled with the same size holes. However, engineers agree almost without exception that a satisfactory rivet hole is produced by first punching the sheets smaller than the rivet and then reaming them out to the desired points after the sheets are put together. It is in this manner that many locomotive boilers are constructed in England, and that marine boilers are prepared for riveting in several shops in the United States and abroad.

The difference between the strength of sheets which have been punched and which have been drilled with the same size holes is not great when the material is soft; and if very soft there is practically no difference whatever; but if the material be hard, such as that used in steel beams for architectural purposes and in some classes of bridge work, then a punched sheet is liable to suffer during punching, and to be weakened thereby more than one which has been drilled. However, the best class of soft and tough boiler material, such as is used for the average stationary or locomotive boiler, will not be so injured by punching as to render it necessary to drill the sheets. There are other and more disadvantageous features of boiler construction to be improved before resorting to drilling of the average boiler sheet, and in the conclusion of the committee, that punched sheets were superior to drilled sheets, there is much truth from a commercial standpoint.

The committee on material and tests reported that they must adhere to their original decision, that iron as a material for general boiler construction is out of date. This decision is well made, and nearly all engineers will agree therewith when the selection of steel as a substitute is carefully carried out, but will not agree that iron is out of date where steel of non-uniform character, excessive hardness or low tensile strength is to be substituted therefor. The following is an extract from that portion of the report referring to steel vs. iron for boiler construction and test pieces:

After duly weighing all statements and arguments by the advocates of iron, we can only adhere to our original decision, that iron as a material for general boiler construction is out of date.

While in the standard of steel recommended by us and adopted unanimously by the convention, we limited ourselves to requirements and tests which any good steel mill can comply with in its every-day product, and within a range of cost making it practical and possible for every maker of safe and honest boilers to use it in his regular line of trade; and while still better material can be furnished for special requirements by the steel mills; it appears that the best possible boiler iron of to-day, while undoubtedly better than the best brands of 10 or 20 years ago, cannot reach the moderate limits of tensile strength and ductility established for the A. B. M. A. brand of boiler steel, and that the modern and practically universal shape of test section, adopted by this convention, cannot be conceded by the iron men, so that as a compromise between the modern 8-in. section and the antiquated groove section your committee conceded a 2-in. section for iron.

It appears, however, that for certain localities, where either necessity or prejudice compels the use of impure feed waters, without previous purification by any of the well-known mechanical or chemical means of modern good practice, boiler manufacturers are obliged to use iron in place of steel in boilers, or at least in certain parts of the same. And it is known, moreover, that the slags or impurities of iron resist corrosion better than iron itself.

We therefore recommend that the brand A. B. M. A., with the addition of the word "Iron," may be granted to manufacturers of boiler iron whose product will come up to the following requirements: Tensile strength, 52,000 to 62,000 lbs. per sq. in.; elongation, not less than 20 per cent.; test pieces, 2 in. in length between fillets, cut both lengthwise and crosswise of the sheet; the iron to show no laminations, but to be homogeneous throughout. On fracture it must only show one quality of texture across the entire break.

As most of our readers know, single track roads in Great Britain are, as a rule, worked on the staff and ticket system. With a small traffic, and trains running at stated times, it is possible to work this system without delay, but where the traffic is heavy and variable, and where a time table cannot be adhered to, serious delays result, due to the fact that if a train has been dispatched from station A to station B with a staff, a train running out of course or a special train arriving at A, cannot proceed until the staff has been returned from B. To get over this difficulty the London & Northwestern has adopted a new system, the joint patent of Mr. Webb, the Chief Mechanical Engineer, and Mr. Thompson, the Signal Engineer, whereby a number of staffs are provided at each staff station in suitable receptacles, and so controlled by electrical and mechanical devices that although only one staff can be in use at a time, the moment the staff in use has been deposited in the receptacle, say at B, a second staff can be obtained by A, and so the delay of waiting for the staff previously sent to B to be returned to A is avoided. The apparatus has been in use on a busy section of the London & Northwestern for about 12 months, during which time it has, we understand, proved itself to be in every way reliable. A valuable feature of the system is the key interlocking which is combined with it. Each staff is formed into a key at one end, which unlocks the switch of any siding located between the two staff stations. The staff is used to unlock the switch, and immediately this is done the staff itself becomes locked, and cannot be withdrawn until the switch is again set for the main track and locked. This is in many respects an ideal system, as it apparently provides a perfect block system if used with

out tickets. By making the staff in halves, and placing one part in the hands of the rear brakeman, it would be possible to provide against reporting the block clear when a train had broken in two. There are many single track roads in this country, especially short branches, on which something on the principle of the staff system would enhance the safety of train running, and this invention would seem to be worthy of notice. On a branch where the trains are usually handled wholly by a single crew the common practice is sometimes a source of delay, if not of anxiety, as when a snow plow, inspection train, or other extra is to be run. There is hardly any road which owns more than one engine—certainly none in our northern latitudes, where snow-storms are severe—that should not consider the adoption of the block system, when it can be had with so little complication as seems to be here promised.

On Oct. 24, the subscription books for the \$5,000,000 guarantee fund to be raised for the World's Fair of 1892 were opened in New York, books being sent to the principal newspaper offices and to representatives of the various trades and professions. At the same time Mayor Grant issued an appeal, urging prompt and liberal action, "that the people of the United States may know that the citizens of New York are ready to do all that is essential to make the proposed exposition worthy of the position of the United States among the countries of the world." The opening subscriptions will probably fall far short of impressing the people of the United States. Perhaps there will be a more enthusiastic response in the future, but it is doubtful. The subscriptions for the first five days aggregate \$1,613,612, the total for the first day being \$390,000, of which \$250,000 came from the New York Central & Hudson River Railroad and its allied interests.

The Committee on Finance have not set a very good example, only eight of their number having contributed to the guarantee fund. Several influential citizens have written letters declining to subscribe if there is any disposition to fix the site in Central Park. The Presidents of the Pennsylvania and the New York, Lake Erie & Western Railroads are inclined to wait until the locality of the Fair is selected definitely before subscribing. The Executive Committee on Site and Buildings have held a number of secret meetings, and announce that "it was unanimously resolved that a map be prepared and a copy of it be sent to each member of the committee, with a statement that a vote will be taken at the next meeting on the exact boundaries of the site which the committee shall deem most desirable."

In Chicago, it is expected that the guarantee fund will amount to \$10,000,000 by the time Congress meets; and it is stated that over 100 Congressmen have already committed themselves for Chicago. It might have been well if the New York committee had studied and copied the business methods of the Chicago organizers.

In a private letter from Mr. T. W. Worsdell, Locomotive Superintendent of the Northeastern Railway, England, we have received some information regarding the new compound locomotive which he has built for the Scotch express. It is to be noticed that on one occasion this locomotive hauled 32 carriages, of a total weight of 270 tons, which, together with the locomotive and tender, weighing 87 tons, made a total load of 357 gross tons. This load was hauled from Newcastle to Berwick, a distance of 67 miles, in one hour and eighteen minutes, which is just three minutes less than the Scotch express time. The number of cars in the Scotch express is considerably less than this. The new engine is now regularly hauling fast trains between Newcastle and Edinburgh, and has been in service without alteration or correction from the time it was first put out. This gives evidence of the simplicity of its parts, to obtain which is the continual endeavor of Mr. Worsdell in the construction of his type of engine. The size of the cylinders is considerably increased, and being placed within the frames it has become necessary to place the valve seats outside of the frames. In order that the cylinder barrels may have room one is elevated above the other; both, however, working upon the same axle centre. The cranks on the crank axles are made with circular cheeks, which facilitates the construction and increases the strength, as well as renders possible greater lengths of bearings without necessitating the shrinking of iron hoops on to the cheeks. From end to end the crank axles are turned up on a lathe and do not require the use of planers to finish them.

Many railroad officers and some mechanics, who are not in the employ of the roads, are looking forward with great interest to the trials of the different designs of machine snow-plows this winter. In the yard of the Chicago, St. Paul & Kansas City in St. Paul is, awaiting its first trial, the great "cyclone" snow-plow built by the Vulcan Iron Works in Chicago last spring for the Cyclone Steam Snow-Plow Company, and illustrated at the time in the *Railroad Gazette*. The Chicago, St. Paul & Kansas City has ordered one of these plows. Seeing this plow with its ponderous machinery and immense auger intended to break up hard-packed snow-banks, and realizing that there are now on the market several varieties of rotary snow-plows of radi-

cally different construction, leads one to look forward to strong competition in snow-plow tests during the coming winter, and it is to be expected that the results of the prospective trials will settle to some extent the relative values of the different designs for heavy work. This is the most ponderous and perhaps the most powerful of all the machine snow-plows yet brought out, and of radically different principle and construction from the others, but it has never had any severe test. It is where its capabilities will be likely to get a thorough trial early in the season.

The Southern Railway & Steamship Association has issued a circular giving very full regulations for the collection of storage, which are to go into effect Nov. 1. The paragraph concerning carloads provides for a "demurrage" charge, the rate being one dollar per day. Small shipments are to be charged one cent per 100 lbs. per day, minimum ten cents per package. Carload freight not included in the term "bulk freight" is to be charged five cents per ton per day. There are provisions concerning stopping cars in transit, giving due dispatch to all cars, and the other conditions usual in such rules. When owners refuse to pay demurrage bills the roads are to refuse to place other loaded cars for them until they pay. This provision is similar to one in the form of agreement reported by the Time Convention Committee, and seems of doubtful legality. Not many bills of lading have a provision permitting railroads to hold one shipment for charges on another, and where it is present it is not always easy to enforce it. Refusing to place a bulk car is substantially refusing to deliver the goods. The paragraph giving notice of storage charges, which the Southern Association is to insert in bills of lading, binds the carrier to give due notice to the consignee of the arrival of property.

The class H engines on the Chicago, Burlington & Quincy, which our readers will remember are of the mogul type, having a two-wheel truck in front, are still running with good success, and will probably be the standard type of locomotive, both for passenger and freight service, on that road. One of the most interesting features in connection with this locomotive is the use of the radial truck in front. It has been claimed that four-wheel trucks are necessary to properly guide locomotives and reduce the wear on the front driving tires; but a recent examination of the driving tires and truck tires on one of these engines, that had run over 60,000 miles without turning, during a period of eight to ten months of hard service, shows that the front truck is operating satisfactorily as a guide to the engine and as a protection to the front driving tires. There are advantages connected with the use of a two-wheel truck in front, not the least of which is the possibility of removing excessive weight from the front end and increasing the weight available for adhesion without a corresponding increase in the total weight of the locomotive.

The new class I engine, No. 83, on the Chicago, Burlington & Quincy is now doing a regular service of 98 miles and 107 stops per day on two tons of coal, with three to four cars. This locomotive is one of the most novel designs recently produced in the United States. Its wheel base is like that of the class H engine used on that road with the two-wheel truck placed in the rear. The tank is carried on the extension of the locomotive frames, similar to the Forney type. The two-wheel truck is not equalized with the drivers, but the six drivers are equalized together. It is a large suburban engine designed with a view to economy in the consumption of fuel and the rapid acceleration of heavy suburban trains. It has many novelties, among which are the peculiar location of the sand box, a new driver brake gear, and cab arrangements of original design. The results of continued use of this locomotive will be watched with interest, because such engines are in continual demand for heavy suburban service, and this machine, having a minimum weight upon the truck, and thereby a maximum percentage of total weight available for adhesion, will be attractive, if as successful as it now promises to be.

The Boston & Albany has abandoned its experiment in electric train lighting. The trial was on two full trains, and has continued for two years and a half. It has been instructive and valuable, as an experiment, and, therefore, was praiseworthy; but the great expense was apparently too heavy a burden. The shutting down of the electric lighting systems in New York and the consequent inability to have the storage batteries charged at that end of the line, together with the occasional failure of the lights to burn satisfactorily, finally decided the company to discontinue them, at least until some more satisfactory and economical method of using them is discovered. The trains which have been electrically lighted are to be fitted with the Pintsch gas lighting system. Wagner cars using the Pintsch system are now running to Boston over the Boston & Albany, so that this announcement implies, we suppose, the establishment of a Pintsch plant at Boston, though the New York cars can be charged at the New York Central yards in New York.

Those who are interested in dynamometer cars will find an illustration of one built for the Western railroads of France and exhibited at the Paris Exposition, in *Engi-*

neering, Oct. 4, current volume, pages 388 and 389. The Western railroads of France, previous to the construction of this machine, had been using Mr. Stroudley's, of England, and one from the Eastern system. This new dynamometer car is fitted up in an excellent manner, and contains an apparatus for the analysis of the gases from the smoke box of the locomotive at the time of the tests with the other apparatus, or during a particular run.

Philadelphia papers report that the Pennsylvania has begun work on a new overhead bridge at Thirty-fourth street, West Philadelphia, of which the total cost will be about \$115,000, the city to pay \$40,000 of this. This location is close to the junction of the New York and the Philadelphia divisions, and it is said that on the completion of the bridge one or two street crossings will be discontinued and the arrangement of connecting tracks materially changed.

NEW PUBLICATIONS.

Localbahnen, Seine Organisation und Bedeutung für die Weltwirtschaft. Von Friedrich Freiherr von Weichs. Leipzig, A. Hartleben, 1889. 8vo., 93 pp. (Secondary Railroads; their Organization and Importance in the World's Economy.)

This is a little pamphlet of 93 pages, of which 10 are taken up with "Definition and Classification" and 13 with "The Natural Laws of Traffic." The book might be readable for a German public, delighting in long-winded analysis; but it is safe to say that not one American out of one hundred of the men directly interested in the subject could, without some personal inducement, be got to read beyond the third page, on which occurs this remarkable sentence: "With increasing culture grew also the demand for better communication and means of transport, and so there arose out of the increasing development of trade and general traffic through the hand-in-hand-going extension of technical knowledge and the improvement of technical resources, roads, land and waterways, which penetrated the whole country, finally covered the same with a close net work, and through diminution of friction and conquest or evasion of natural obstacles allowed constantly increasing loads to be carried with improved speed and safety."

As a sample of the author's development of "the Natural Laws of Traffic," his "Law of the Density of Traffic" may be cited. This is: "The transport system of a country must, as a whole, according as its parts stand in relation to each other, at some time develop the proper density of traffic." After laboring with this law for a page and a half, the following mouse is born: "From which it follows that branch roads can and should only spring up where production either is already found in an advanced condition, or where the conditions for its existence are undoubtedly present. Infraction of this law will always be bitterly atoned for."

Herr v. Weichs states a more or less well-known law in saying that "the tendency of improved communications is to raise prices and wages where they are below the average and depress them where they are too high. This comes through the better market afforded for the low-priced goods and their competition with those of high price." The same reasoning applies to labor.

When we get down into the practical bearings of the subject, one of the first theorems that Herr Weichs lays down is that when the traffic on a branch goes toward one or the other end of the main line in greater proportion, the branch should incline from the right angle to the main line, toward the terminus drawing or giving the heavier traffic. Under actual topographical conditions it does not seem likely to largely affect the railroad location of the future. We should note the author's extension of this fine theory to a branch with traffic only toward one terminus of the main road, which he says would call for the building of a parallel road instead of a branch. This is certainly the *reductio ad absurdum* of his theory. Imagine a railroad company building a parallel line of a couple of hundred miles to carry the traffic of a town, say, 20 miles off its main line because the town had no trade except with one of its termini.

In these days of the wane of the narrow-gauge system a man seems antiquated indeed who attempts, as does the author, to controvert the arguments of the celebrated railroad economist Weber against this Jonah's gourd in the history of railroads. On page 48 is found the following formula. The postulate is that the narrow gauge will be more profitable when "the excess of cost of narrow-gauge rolling stock + the relative transshipment cost + by the length of the narrow-gauge location is less than the difference of the construction cost of the two systems + the difference of the useful load on each + by the length of the standard-gauge location." This formula reminds one of a story told of an ambitious young railroader in the West to whom the following question was propounded by some wagging office mates: "What relation does the diameter of a locomotive driving wheel bear to the length of stroke?" This question proving too heavy for his technical knowledge he passed it on to the master mechanic of the division, a jocosely Yankee mechanic, and received the following reply: "About the same relation that the size of a dog bears to the length of his tail."

In discussing the subject of tariffs, the author touches upon one point to which but little attention has been given in this country, though a practical consideration. This is the "virtual length" of a railroad as compared with its actual length. Engineers have given this matter much attention in comparing the relative advantage of two or more possible locations, but, when tariffs are made, the inequalities of the line, which are a very important element of the cost of hauling, are often disregarded. When other considerations do not

govern (as they generally do), they are made proportional to the horizontal haul plus an allowance for terminal expenses. A juster method would be to have the lengths between stations, as made up of horizontal distance and rise and fall, reduced to equivalent horizontal distances, which would in most cases be different in opposite directions of the traffic.

Herr Weichs quotes the German economist List to the effect that the first duty of a nation is to develop its own resources, but observes that this development cannot be obtained by protective or even by prohibitive duties, which must tend to the advantage, if not of individuals, at least of certain classes of the population. The true method of development lies in the fullest extension of the traffic facilities of the country. He quotes Neumann Spallart to show that the idea of the independence of a country of its neighbors and even of its remotest antipodal contemporaries, so to speak, is a relic of the middle ages and entirely foreign to the spirit of this century.

The undiminished importance of waterways in Europe as traffic factors is shown by the following facts quoted by Herr Weichs:

The traffic on the Rhine was in

	Tons.
1870.....	5,663,290
1880.....	9,276,000
1886.....	14,470,492

On the Neckar in

	Tons.
1880.....	107,913
1886.....	348,297

TRADE CATALOGUES.

Evans & Howard, manufacturers of locomotive fire brick, gas retorts and sewer pipe, have issued a catalogue describing their different articles of manufacture, among which is a description of locomotive arch tiles made by them, and a method for supporting the same. This company is furnishing fire bricks to the principal railroads in the vicinity of St. Louis and other roads in the West.

The Fires Improvement Company, 31 York Chambers, Toronto, have issued a pamphlet on perfect combustion. This pamphlet describes the construction and use of their devices for reducing smoke and increasing the economy of fuel consumption.

Remington & Henthorne, Mechanical and Consulting Engineers, agents for E. P. Allis & Co. in the East, at Providence, R. I., have issued a pamphlet describing one of the most modern steam engine plants in the United States. They are erecting a new electric light station for the Narragansett Electric Co. in Providence. The engines to be used are triple expansion engines of the Corliss type, manufactured by E. P. Allis & Co., Milwaukee. Engineers in general will find the pamphlet very interesting, as it describes some of the novel methods of construction and improvements in the location of such machinery generally. The pamphlet consists of 15 pages, containing cuts of the buildings, boilers, plans and locations of the machinery, as well as details of many of the new devices. The offices of the firm are at 146 Westminster street, Providence, R. I.

The Lunkenheimer Brass Manufacturing Co., of Cincinnati, O., has just issued a new and novel circular for advertising its specialties. The object is to stimulate a demand for the goods and to quote prices, meantime keeping a record of the same without the necessity for the usual correspondence. The circular is small and neatly printed, with cuts of the different specialties attached to one end, and perforated so that they can be quickly removed, filled in with copying ink, copied in a copying press, and mailed to get the desired prices without an extended description. Errors in this manner rendered almost impossible. The idea is a novel one, and the circular will undoubtedly prove a great convenience to purchasers.

Foreign Railroad Notes.

State railroads are making progress in Russia. In 1883 the government owned about 1,000 miles; now it has 3,400, and more are to be taken directly.

Prussia, considered to be quite fully provided with railroads, has 923 towns of 2,000 inhabitants or more not situated on any railroad.

The city of Buda-Pesth proposes to have the house sweepings carried by rail and dumped some miles distant. It will furnish 18 carloads of sweepings daily, and offers to pay \$3 a carload for hauling them.

In the year 1888, on the railroads of the German Empire, having 25,318 miles of road and 7,363 miles of double track, 4,577 tires broke, 3,492 of them in the winter months. By these failures of tires, 26 derailments and 268 delays of trains were caused. The distance run by tires in the year was 7,027,692,970 miles, so that 1,535,436 miles were run to one breakage.

One day last August there was a race at Berlin between a balloon and a railroad train. Scarcely had the train left the Stettin station on the line to Stralsund when directly over it, about 2,500 ft. above the earth, one of the military balloons came flying, as if driven by a strong wind, in the same

direction with the train. After some miles running the train was a little ahead, but then the balloon (probably being hampered by no time-table) let itself out, drove past the train, and in a short time was out of sight of the astonished passengers. After two hours' running the train stopped at a station which the balloon had passed half an hour before.

In the Paris Exposition the Orleans Railroad shows a table giving the number of cars, and their gross weight, of which its through passenger trains have been composed at different dates, as follows:

	1840.	1854.	1867.	1878.	1889.
Number of cars.....	14	24	24	24	9
Weight of cars, tons.....	99	204	231	248	312

Thus the cars, which at first weighed about seven tons each, have grown heavier and heavier, and since 1878 have more than trebled in weight, chiefly due to the recent introduction of very long cars on trucks, having a very large seating capacity. These, however, are not yet general in the through trains.

A Russian writer, arguing for the general introduction of grain elevators in that country, describes the present method of handling and the losses caused thereby. On the farm, he says, a hired laborer carelessly shovels the grain into bags and hauls them to the station or river landing, where he throws them down wherever he can get rid of them quickest. Then comes the porter with his iron hook, sticks it into the bag and hoists it upon the car or drags it into the boat. When the cargo reaches its destination it suffers a similar treatment, and more holes are made in the bags. This writer estimates that at the Baltic ports, Libau and Riga, 1 per cent. of the grain is spilled; and at Odessa and Rostov from 3 to 6 per cent., and on the average of all grain transported as much as 2 per cent., or say 12,000,000 bushels in all, worth \$5,000,000; and he estimates the yearly cost of bags at half that sum—ergo: elevators. Perhaps we may regard it as an answer to this publication that the construction of ten elevators has been ordered on the chief railroad of southwestern Russia, one of them in Odessa.

TECHNICAL.

Locomotive Building.

The Brooks Locomotive Works are to build for the Montgomery, Tuscaloosa & Memphis road, seven 8-wheel locomotives, at \$8,500 each, and eight ten-wheel locomotives, at \$9,500 each. The engines will be operated under a lease held by the New York Equipment Co., that company advancing the purchase price.

The Gulf, Colorado & Santa Fe has just received two new Baldwin locomotives for handling heavy business on the south end of the line.

Car Notes.

The Lebanon Manufacturing Co., of Lebanon, Pa., is building 200 gondola cars for the Huntington & Broad Top road.

The Fort Wayne, Cincinnati & Louisville is soon to place an order for 400 freight cars.

The Ohio Falls Car & Mfg. Co., of Jeffersonville, Ind., is employing 875 men, and the works are running day and night to complete orders.

The Pullman Car Co. is building 200 refrigerator cars for the Merchants' Dispatch, and the same number for the American Refrigerator Co.

The Central of New Jersey has recently added 25 new passenger engines to its equipment.

In addition to the order for 200 stock cars which the Pennsylvania Co. recently placed with the Missouri Car & Foundry Co., of St. Louis, it has ordered 200 box cars of that firm, and also placed an order for 100 gondola cars with the United States Rolling Stock Co. All the cars are to be equipped with air brakes and M. C. B. couplers. This makes 3,900 freight cars contracted for by the Pennsylvania lines west of Pittsburgh this season, instead of the 2,000 originally intended.

The Pittsburgh & Western has ordered 900 coal cars of the Indianapolis Car Works and 600 of Pennock Bros., Minerva, O., and will soon let 500 box cars.

The Indianapolis Car & Mfg. Co. has been awarded the contract to build 300 platform cars of 60,000 lbs. capacity for the Ohio & Mississippi.

The Lake Shore has let contracts for 1,400 box cars—700 to the Peninsular works, 400 to Barney & Smith, 200 to the Indianapolis Car Co., and 100 to the Buffalo Car Co. The same road will soon place contracts for 1,000 coal cars and 500 box cars.

The following roads are in the market for box cars: Buffalo, Rochester & Pittsburgh, Toledo & Ohio Central and the Chicago & Northwestern.

The Montgomery, Tuscaloosa & Memphis road has leased from the New York Equipment Co. the following rolling stock: Eight first-class passenger coaches, at \$4,500 each; six second-class passenger coaches at \$4,000 each; five baggage, mail and express cars, at \$3,100 each; five cabooses, at \$800; 200 platform cars, at \$325 each; 150 box cars, at \$440 each; 100 gondolas, at \$500 each. The total value of the property contracted for is \$381,500. The passenger cars are to be built by the United States Rolling Stock Co. at its Hegewisch shops, and the freight cars will be built at the Anniston and Decatur shops. The company is to pay 15 per cent. on delivery, and execute lease warrants for the balance due, divided into three payments, falling due in six, twelve and eighteen months.

Bridge Notes.

Proposals are wanted until Nov. 11 for erecting five bridges in Gage County, Neb., by the board of supervisors at Beatrice.

Proposals are wanted by the city authorities until Nov. 11 for constructing a bridge across Beaver Island at Fourth street, Clinton, Ia.

The Newport News & Mississippi Valley Co. will build an iron bridge 175 ft. long and 37 ft. wide over its tracks at Fifteenth street, Covington, Ky.

Twelve bids were received for the construction of two iron bridges over the Bosque River, in Bosque County, Tex., at Iredell and Valley Mills. The contract was awarded to the lowest bidder, Milwaukee Bridge & Iron Works, for \$11,900.

It is proposed to build a bridge to connect the turnpike roads of Atlanta and Cape May counties, near Somers Point, N. J. It will cost about \$40,000.

The board of supervisors of Fresno County, Cal., have ordered an election on Nov. 30 to determine whether the county shall issue bonds to the amount of \$100,000 for building highway bridges.

The Fayette & Allenport Bridge Co. has been organized by Thomas R. Hutchinson and others to build a bridge across the Monongahela river, from Union street, Fayette City, to James street, Allenport, Washington County, Pa.

It is proposed to build an iron bridge across the river at Munfordville, Ky.

The highway bridge across the Cumberland River at Pineville, Ky., which is to be built by the county at an expense of \$10,000, will have a span of 300 ft. from centre to centre of abutment, and a roadway of 16 ft. in the clear, to support a moving load of 12,800 lbs. per lineal foot. Bids will close Dec. 2.

The Knoxville & Northeastern proposes to build a railroad and highway bridge over the French Broad River at Dandridge, Tenn.

The selectmen of Cornwall, Vt., have let the contract to the Vermont Construction Co., of St. Albans, to build an iron bridge on the road from Middlebury to Bridgeport, in place of a wooden structure erected 32 years ago.

The Harrisburg Terminal Co. has requested permission of the city of Harrisburg, Pa., to build a bridge over the Susquehanna River at that point in furtherance of the plan to get a Western outlet for the Philadelphia & Reading. It is the intention to build an iron viaduct from the river to connect with the Philadelphia & Reading, a distance of about one-fourth of a mile, crossing the Pennsylvania tracks and the canal. On the other side of the river the bridge will connect with the Harrisburg & Potomac.

The trustees of Milford, Conn., have voted to erect a new bridge over the Wopowage River at North street.

The board of supervisors of Lauderdale County, Miss., will probably erect bridges over Gaddis and Oktibbeha creeks.

The Columbus, Lima & Milwaukee will soon let the contract for erecting an iron and steel bridge over the Scioto River at Dublin, O.

Bridges are proposed at Davenport, Ia., over the Sugar River, at Fairmount, N. H.; Worcester, Mass.; Green Bay, Wis.

The construction of the Chandlere Bridge over the Ottawa River, between Ottawa and Hull, which has been built by the government, has been completed, and the bridge opened for traffic. Last season Parliament voted \$35,000 for the construction of a carriage and foot passenger street bridge at this point, Rousseau & Maltrien, of Montreal, receiving the contract. The dimensions are as follows: Extreme length, 236 ft.; width, 45 ft.; height from floor to beams, 34 ft. over all; height from water level to floor, 40 ft.; weight of structure, including floor, 400 tons. It is built of Belgian steel supplied by Thomas Robertson & Co., Montreal. The stringers weigh 5,000 lbs. each, a portion of the steel being 1 in. in thickness. The roadway is 30 ft. wide in the clear, with sidewalks 5 ft. 6 in. wide on either side.

Manufacturing and Business.

Merchant & Co., of Philadelphia, Pa., has closed a contract with the United States government to furnish the mints 100,000 lbs. of copper blanks for making one-cent pieces, and 50,000 lbs. of nickel blanks for coining five-cent pieces.

The Ingersoll-Sergeant Rock Drill Co., of New York, has been awarded the first prize, a gold medal, for its exhibit at the Paris Exposition.

The business of manufacturing steel fittings for air-brake equipment on passenger coaches and locomotives has grown to be a large one, and is the especial business of Messrs. Stanley G. Flagg & Co., of Philadelphia. They are supplying the principal railroads, and are the makers of the Keystone soft-metal, conical-seat union for locomotives.

The Springfield Glue & Emery Wheel Co., of Springfield, Mass., is to be reorganized, and the works and office are to be moved to Bridgeport, Conn. The new corporation will be styled the Springfield Emery Wheel Co.

Several cars of the Missouri Pacific have been equipped with the Keystone M. C. B. coupler, and service tests are being made.

The American Well Works Co., of Aurora, Ill., has just completed drilling a number of wells in Texas for the Texas Pacific and Southern Pacific roads. The company has finished at Galveston a 15-in. well for the city, finding water at a depth of 1,000 ft. It is now drilling at Corpus Christi, a 15-in. well, having reached 1,500 ft. and still sinking.

It is stated that the Phoenix Iron Works is preparing to put up a Bessemer plant for the manufacture of rails and structural shapes. This will be an addition to the open hearth plant which the company has now in operation.

The city of Ottawa, Ont., will receive bids until Nov. 14, for 6,300 ft. of 40-in. cast steel pipe for waterworks. The estimates are to be made on cast steel boiler plate pipe, riveted with 70 flexible and 50 flanged joints. The first delivery is to be made Jan. 20, and continue at the rate of 100 ft. a day thereafter.

Carnegie, Phipps & Co. have contracted with the Thomson-Houston Electric Co. for two 35-light 2,000 c. p. arc light dynamos, to be placed in the Homestead mill.

During the past few weeks the Thomson-Houston Electric Co., of Boston, has completed the electrical equipment of a number of street railroads on which the electric cars are now in daily operation. Among them are roads at Kansas City, Mo.; Omaha, Neb.; Peoria, Ill.; Decatur, Ill.; and Quincy, Mass. Seven roads, with a mileage of 44 miles, have been equipped with 63 cars; the line at Omaha, 10 miles long, being furnished with 26 cars. The company has also closed contracts for roads at the following cities: Albany, N. Y.; Nashville, Tenn.; Kearney, Neb.; Macon, Ga.; Toronto, Ont.; two lines at St. Paul, Minn., and one at St. Louis, Mo. These eight roads will have 114 miles of track, and will be equipped with 116 cars. The St. Paul City line will be 51 miles long, and the St. Paul & Minneapolis line, 20 miles long. The Albany City road, 14 miles long, will have 32 cars, and the Union Depot railroad, at St. Louis, will have 30 cars on 10 miles of road. A contract has been recently closed for a line at San Jose, Cal., which is the first Thomson-Houston road in the state. As one electric

road has already failed in that city, careful investigation was made before placing the contract with the Thomson-Houston Electric Co.

Sales for October of the Westinghouse Machine Co., up to Oct. 21, include 30 engines of 935 H. P. of the Junior type, 16 engines of 645 H. P. of the Standard type, 30 engines of 2,510 H. P. of the Compound type, a total of 76 engines, aggregating 4,000 H. P. Among the prominent buyers were the following: Otis Iron & Steel Co., Cleveland, O.; G. H. Nichols & Co., New York, N. Y.; Allegheny County Light Co., Allegheny City, Pa.; Albion Electric Light Co., Albion, N. Y.; Missouri Electric Light & Power Co., St. Louis, Mo.; Philadelphia & Reading Railroad Co., Philadelphia, Pa.; Girolamo Taddei, Rome, Italy; Koefoed & Hauberg, Copenhagen, Denmark; New York Central & Hudson River Railroad, New York, N. Y. The total sales of Westinghouse engines for August and September, 1889, have been: 59 engines of the compound type, aggregating 5,975 H. P.; 58 engines of the standard type, aggregating 2,180 H. P.; 45 engines of the junior type, aggregating 2,115 H. P., a total of 162 engines, aggregating 9,370 H. P. Among the orders for the compound engines were the York Manufacturing Co., of Saco, Me., for 150 H. P.; the Sawyer-Man Electric Co., of New York, for one engine of 125 H. P., and two of 150 H. P.; second order of the Pittsburgh Locomotive Works, 125 H. P.; third order of the Omaha & Grant Smelting Co., 55 H. P. Among the orders for standard engines were the Ducker Portable House Co., Lyndhurst, N. J., 60 H. P.; the Reliance Steel Casting Co., Pittsburgh, 25 H. P.; the Hoopes & Townsend Co., of Philadelphia, 25 H. P.; forty-first order of the Lawrence Machine Shop, Lawrence, Mass., 15 H. P. Among the orders for Junior engines have been the Jackson Machine Co., of Harrisburg, Pa., for 25 H. P.; third order of the Berlin Iron Bridge Co., East Berlin, Conn., 25 H. P.; Nova Scotia Steel Works, New Glasgow, N. S., 15 H. P.

Iron and Steel.

The Wheeler Iron Co. has purchased the furnace of the Henderson Iron Co. at Sharpsburg, Pa.

Howe, Brown & Co., limited, of Pittsburgh, Pa., will increase their capacity for manufacturing steel by the erection of a 20-ton open-hearth furnace.

At the Allegheny Bessemer Steel Works, at Duquesne, Pa., the production last week was 3,143 tons. Work has been begun on a large order of 70-lb. rails for the Pennsylvania, and the output for some weeks will be quite large.

James P. Witherow, of Pittsburgh, has the contract for building furnace plants at Buena Vista and Graham, Va., for the Virginia Steel Co.

The firm of Jennings, Beale & Co., Limited, operating the West Penn Steel Works, at Leechburg, Pa., has been dissolved by mutual consent, B. T. Jennings having purchased the interest of J. G. Beale. The works include an open-hearth furnace and finishing department.

The first completed blast furnace of the Pennsylvania Steel Co., at its new works at Sparrow's Point, Md., was lighted Oct. 23. When in full operation the furnace will require about 500 tons of ore, 500 tons of coke and 150 tons of limestone per day, and the product will be about 250 tons of pig iron per day and about 350 tons of waste slag. Three companion furnaces are now in course of erection.

Ritter & Conley, of Pittsburgh, have received the contract for erection of two new blast furnaces for the Monongahela Furnace Co., of McKeesport, Pa. The foundations are about completed and work will be commenced at once. Ritter & Conley are also building the two new blast furnaces for Carnegie Bros. & Co., Limited, at Braddock, Pa.

Secretary Tracy has not yet acted on the report of Commodore Sicard upon the Thurlow steel cast gun. This gun was tried about eight months ago, and successfully stood the regulation 12-round test. The star gauge, when applied, showed that the gun had expanded somewhat, and upon this report Commodore Sicard made an endorsement favoring its rejection. The owners of the gun have asked an early decision, and the matter will probably be decided this week. The impression is that the gun will be accepted, conditionally, for experimental purposes.

The proprietors of the rolling mills in and about Youngstown, O., are preparing plans for the erection of a large steel plant, each establishment to take portions of stock in a company to be organized to build and operate the steel works. The Mahoning Valley Iron Co., the Youngstown Rolling Mill Co., Cartwright, McCurdy & Co., the Andrews Bros. Co. and others will form the company.

The work of refitting the Indianapolis rolling mill, for the use of the newly organized Premier Steel Co., will be begun in a few weeks, and it is expected to have it ready for operation Jan. 1.

The erection of extensive malleable iron works at Walkerville, Ont., near Windsor, will probably be commenced immediately. When in operation the works will give employment to about 400 hands.

It is stated that the great Norway Iron Works of South Boston, which were sold recently to a syndicate, will soon be removed to either Peoria or Reed City, Ill., or Des Moines, Ia.

The Rail Market.

Steel Rails.—The purchase of an additional 10,000 tons by the New York Central & Hudson River road and of 5,000 tons by the New York, Lake Erie & Western are the only sales reported in the East, but some heavy business is in sight. The shipments of rails up to Oct. 1 were 919,874 gross tons, including only heavy rails and not the shipments of the Allegheny Bessemer Steel Co. Quotations in the East are nominally \$32, at Chicago \$35, and at Pittsburgh \$33@34 cash, at mill.

Old Rails.—In the East the market is quiet, small sales being made at \$24.50 to \$25. In Chicago old iron rails sell at \$25.50 and old steel rails at \$19.50. No business has been done at Pittsburgh, quotations continuing at \$26.75 to \$27 for old iron rails.

Track Fastenings.—Quotations are \$2.15 to \$2.25, delivered, for spikes and \$2 to \$2.15 for angle bars.

Steel Ties.

A carload of steel ties has been shipped to the Chicago & Western Indiana Railroad Co. from the Homestead Works of Carnegie, Phipps & Co.

A Large Steel Steamboat for the Lakes.

The Detroit Dry Dock Co. has closed a contract with the Inter-Ocean Transportation Co., of Chicago, for the construction of one of the largest steel steamships on the lakes. It will be arranged to carry from 800 to 1,000 tons of water ballast, and will be able to enter Chicago harbor with a cargo of over 3,000 gross tons. The company will

use the ship chiefly in the transportation of iron ore from Escanaba. It will be ready for next season's business.

A New Automatic Block System.

An automatic block system designed especially for use on single track roads has been invented by T. D. Williams and J. S. Lacock, of Pittsburgh, and is now in use experimentally on the track of the Pittsburgh & Western in Allegheny City. Semaphore signals, actuated by electricity, are erected on both sides of the track, one set being for trains in one direction and the other for use in running the opposite way. A battery is carried on the engine and the current is conducted to the signals through contact pieces laid upon the sleepers at the end of each block. The connections from end to end of block sections are made by line wire either on poles or underground, but are so arranged that a train entering a block will not only set the signal behind it at danger, but will also throw to danger the signal on the other side of the track at the further end of the section, thus protecting itself against collisions as well as against rear. The distinctive feature of this system is the employment of polarized relays, by which but one wire is necessary for each set of signals, the equipment for a single track line with signals on both sides thus requiring only two wires over any part of the road.

Notes on the Central of Georgia.

An interview in the Birmingham *Age-Herald* with President E. P. Alexander says that the business of the Central and its branches is very heavy. The road had 1,000 cars delivered between June 1 and Oct. 1, but in the last few days it has been found necessary to secure 500 more, which have been rented for five years. Contracts have already been let to build 1,000 cars. The shops have not been able to do a great deal more than to keep up repairs, although there are 200 flat cars under construction in the shops. Two hundred of the cars purchased and rented are flat cars, 200 ventilated fruit cars, and 100 coal cars. Since the beginning of the year the road has bought 10 locomotives, but the power is still inadequate to do the work, and another contract has been made for 10 freight and three shifting engines, which are to be delivered within the next 30 days. The road is also contracting for 12 passenger and a number of baggage and express cars.

Sixty-eight pound rails are being laid between Pooler and Eden, and there is on hand and to arrive 20 miles of this size, to take the place of the 56 lb. rails from Savannah northward. The 56-lb. rails, which the heavier rails are displacing, will be put down in place of the iron rails on branch roads.

Lake Erie & Ohio River Ship Canal Commission of Pennsylvania.

Under authority of act of May 8, 1889, Governor Beaver, of Pennsylvania, on Oct. 9 appointed the following-named persons to be commissioners to make inquiry as to the feasibility of constructing and operating a ship canal to connect the waters of Lake Erie with the upper Ohio River, and in case the project be adjudged reasonable, to survey and locate a route for such canal, and to make estimate of cost of construction, the commission to report to the General Assembly of Pennsylvania at the session to commence on the first Tuesday of January, 1891, viz.: John A. Wood and Reuben Miller, Jr., of Pittsburgh; W. S. Shallenberger, of Rochester, Pa.; John M. Goodwin, of Sharpsville, Pa., and Eben Brewer, of Erie, Pa. Mr. Wood is head of the firm of John A. Wood & Son, coal miners and shippers by the Ohio River. Mr. Miller is of Miller, Metcalf & Parkins, Crescent Steel Works, and is a member of the Johnstown "Flood Relief" Committee. Mr. Shallenberger is the well-known ex-Congressman of the Southwestern District of Pennsylvania. Mr. Goodwin is a civil engineer, some 12 years resident at Sharpsville, and well known by name to our readers. Mr. Brewer is proprietor of the Erie *Dispatch*, a graduate of Dartmouth College, and was one of the secretaries of the American Commission at Vienna in 1873. Mr. Miller having asked to be excused from duty on this commission on account of his close occupation by the affairs of the Flood Relief Committee, Governor Beaver, on Oct. 24, appointed, instead of Mr. Miller, Thomas P. Roberts, of Pittsburgh. Mr. Roberts is Chief Engineer of the Monongahela Navigation Co., and, under his father, the late W. Milnor Roberts, was for some time engaged on the state canals of Western Pennsylvania.

The commissioners assembled Oct. 24 at Pittsburgh, where they were met by Governor Beaver.

The commissioners elected officers as follows: President, John A. Wood; Treasurer, W. S. Shallenberger; Secretary, Eben Brewer. Any surveys and engineering operations found necessary will be directed by Mr. Goodwin and Mr. Roberts. After a quite thorough consideration of the ground to be covered by its investigations the commission adjourned its session, subject to call of its president. At the next meeting, to be had at an early day, the commission will arrange a plan of operations, in which a careful inquiry regarding available water supply will, presumably, appear as the first move to be made.

Interlocking and Signaling.

A party of railroad men and engineers was on Tuesday evening taken by the National Switch & Signal Co. to see the Koyle semaphore and other apparatus recently put in service at the Kensington crossing of the Illinois Central and the Chicago & Eastern Illinois. There were in the party some 20 representatives of the railroads terminating in Chicago, representatives of the *Railroad Gazette* and other journals and a number of mechanical and civil engineers. The apparatus shown included the Koyle illuminated semaphore, the Palmer torpedo machine and Reif's detector bar. An opportunity was also given to see Mr. Isham Randolph's interlocking signals and facing point lock. The illuminated semaphore was brilliantly distinct at two miles and plainly discernible at three. It showed a brilliant red beam at danger and a white beam at safety. All who saw the operation of the various devices were much pleased.

The Wear of Cables.

A cable recently removed from a California cable road, after a run of 20 months, was thinned down 1 in. Originally it was 1 1/2 in. in diameter, and weighed 44,604 lbs., its length being 17,513 ft. During its life it ran 19 hours a day at a speed of seven miles an hour, its total mileage before removal being, therefore, 79,800. The cable was composed of six strands of steel wire cables, each containing 19 wires, varying from 6 to 8 W. G., twisted round a hempen core 5/8 in. in diameter.

The Merchants' Bridge, St. Louis.

The last pier is finished and it is expected that by Jan. 1 the main bridge will be erected, leaving only the approaches for completion.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

A statute of Georgia, passed in 1808, confers upon railroad companies organized under it power "to acquire, by purchase or gift, lands in the vicinity of said road, or through which the same may pass * * * such as may be granted to and in the construction of said road." Act March 8, 1876 (Code 1286, § 1583), provides, in relation to the consolidation of railroad companies, that the consolidated corporation "shall possess all the rights, powers and franchises conferred upon said two or more corporations." The Supreme Court decides that in order to give a consolidated corporation power to acquire and hold lands granted in aid of the construction of the road, the lines of the constituent corporation must bear such relation to each other or to the general enterprise, that, when completed, they may admit of the passage of trains over two or more of such lines continuously, without break or interruption, as provided by § 1583.

The Supreme Court of Illinois rules that the decision of the Board of Equalization as to the value of railroad property for the purpose of taxation is *quasi* judicial and can be attacked for fraud or want of jurisdiction only. Where the assessment of the tracks of a terminal railroad in East St. Louis at \$34,000 per mile is alleged to be fraudulent, because other railroad tracks located there are assessed only at \$3,500 to \$8,500 per mile, the court will take judicial notice that most of such railroads are long lines, extending considerable distances through the state; that the number of trains and bulk of traffic passing over them daily are comparatively limited; and that the assessed valuation per mile placed upon them, respectively, is the average value of the whole of the lines of such several roads. There were 12 miles of track of the terminal road, all within the limits of East St. Louis, including a relay depot, and the network of tracks connected with it. The road was used for transferring to and from the city of St. Louis the trains of all the railroads entering East St. Louis, and for transferring cars from all the roads entering St. Louis from East St. Louis. The Supreme Court holds that, considering the greater amount of business done on the tracks of the terminal company, the difference in the rates of assessment per mile of track was not ground for inferring fraud, or just ground of complaint on the part of the terminal company. The fact that the property was assessed at \$418,484, while it was assessed at \$234,192 only the year before, does not establish fraud. Where the property cost between \$250,000 and \$300,000 seven years previously, it is not unreasonable to suppose that it was actually worth \$418,484 at the time of the assessment, especially where there is no attempt to show the contrary.

In Illinois the Supreme Court holds that the statute requiring signals at crossings applies to the Illinois Central, although the charter of that road defines its duties as to signals differently.

The Supreme Court of Texas holds that a pamphlet containing the names of discharged employees of a railroad company, with reasons for their discharge, and placed by the railroad company in the hands of persons whose duty it is to employ servants on behalf of the company, is a privileged communication.

Where the persons supplying the information on which such a publication is made are worthy of credit, there is no evidence that it was ever placed in the hands of persons other than the employees of the company, and plaintiff, whose name appeared in the pamphlet, was a stranger to the officer making the publication, there is no evidence from which actual malice can be inferred.

Carriage of Goods and Injuries to Property.

The Supreme Court of California holds that under the state code a private individual may cause land to be condemned for a railroad.

In New Jersey the Supreme Court rules that until what is just compensation has been ascertained in the manner directed by law, and the condemnation money paid, either actually or constructively, it is not within the power of the legislature to dispossess the landowner and put another person in possession of his land.

In Kansas the Supreme Court holds that a settler on public lands, who has made a valid homestead entry, and is in possession perfecting his title, is entitled to full value for all injury done to his possession, where a part of such homestead has been condemned for right of way for a railroad, and the measure of his damage differs only in degree from that sustained by one for the same cause who has a perfect title.

In Indiana the Supreme Court decides that one who has taken no steps to prevent a railroad from taking a portion of his lot until its tracks over it are completed, and its road in operation, cannot maintain ejectment nor enjoin the company, but is confined to his suit for damages.

In Iowa, the plaintiff's mare was in his field, through which defendant's unfenced railroad passed, and was found in the morning with a hind leg broken and one fore leg and her head bruised. The plaintiff contended that she was injured by a train, while defendant alleged that the injury resulted from falling into a cattle-guard. The injury itself was more consistent with the former theory. There was snow on the ground, and she was tracked to a point about opposite, and 6 ft. from the end of a cattle-guard, where she seemed to have lain on the ground, but no tracks were discovered between that point and the track, which was slightly elevated above the ground. Plaintiff testified that he saw her tracks between the rails some distance back of and leading to the guard, but there were other horses in the field by which the tracks might have been made. For some distance back of the cattle-guard tufts of her hair were found on the rails, and also on the guard itself, but no other evidences of any struggle at the guard were observed. The engineer and fireman of a train that passed in the night testified that no horse was struck or frightened by their train. The Supreme Court rules that the evidence sustained a verdict for plaintiff.

An Indiana statute authorizes persons owning land separated by a railroad to maintain "wagon and drive ways" across the railroad, and requires them to maintain substantial gates, and keep them locked when not in use. The act exempts the railroad company from liability for animals killed or injured on the track, "if such animal entered upon the track * * * through such gates," unless the accident is caused by the negligence of the railroad company or its employees. The Supreme Court holds that a company is not liable, if no negligence on its part is shown, for animals killed or injured which entered upon the track at such a private crossing, at which was no gate, cattle-guard, or any obstacle.

In Kansas the Supreme Court rules that under the Kansas railroad stock law the fact that the stock was killed at a highway crossing will not defeat recovery, where it appears that the stock escaped from the pasture through the failure of the company to properly fence its road.

In Pennsylvania the Supreme Court holds that a railroad is not liable for the loss of a mule killed, while straying upon its track, by one of its locomotives, because the engineer did not sound the whistle nor ring the bell on approaching a crossing near which the mule was killed.

Injuries to Passengers, Employees, and Strangers.

In Iowa a civil engineer employed in superintending the laying of the track on defendant's road, was ordered to go to the front with a wrecking train to assist in replacing an engine which had been derailed. On the way the train on which he was riding was derailed, and he was injured. The track at the place of the accident was in bad condition, being laid on wet, soft earth, which had settled; the condition had been made worse by a storm the night before, and the train at the time was being run at a dangerous rate of speed. The Supreme Court decides that defendant was not relieved from its negligence on the ground that plaintiff, by reason of his employment, had assumed all the risk of riding over a new track to and from his work; nor was he negligent in riding in the tool car and not in the caboose at the end of the train.¹³

In Delaware the Court of Appeals rules that an employer impliedly engages to make the service of the employe a reasonably safe one. When acting through agents, he undertakes that his agent shall be a capable person for the position he holds. He must provide a safe place for the employe to work at or upon, and no order with respect to change of position of the subject of the work should be executed without due warning to the employe.¹⁴

In New York the Supreme Court holds that writing signed by an employe during his employment, agreeing that his employer should not be liable to him for any injury sustained by reason of the employer's negligence, there being no agreement as to any future employment or other consideration, is no bar to an action by the employe for such an injury.¹⁵

In Colorado, the Supreme Court rules that a superintendent of the work of extending a line of railroad, who has foremen and workmen under him, whom he employs and discharges at pleasure, and who has entire control of the cars, tools, machinery and men employed, is not a fellow-servant with the workmen, so as to preclude the latter from recovering damages against the railroad company for injuries resulting from the negligence of such superintendent.¹⁶

In New York the plaintiff, on coming near defendant's tracks with a wagon, was compelled to await the passing of a train on another road. When it had passed, the gate-keeper raised the gate nearest the wagon, and plaintiff immediately drove on. Though plaintiff testified that he looked for trains, and saw none, there was nothing to prevent him from seeing defendant's train. After driving onto the first track, the further gate not having been raised, plaintiff saw the gate keeper making signs, which he understood to be an invitation to come on. He saw the train, became excited, and whipped up his horses, and was crossing the tracks, when the wagon was struck by the train, and intestate killed. The Supreme Court holds that plaintiff was not necessarily guilty of contributory negligence in driving on the tracks, without looking carefully for trains, as he might have relied on the gate-keeper's conduct as an assurance that there was no danger, and that it was error to direct a nonsuit.¹⁷

In another case in the same state the plaintiff testified that before attempting to cross, he stopped at the usual place to look for approaching trains; that he looked to the left, the direction from which the train that struck him was approaching, and neither saw nor heard a train; that he then looked to his right for a second or two, while starting his team, and then looked to his left, when the train was upon him. The Supreme Court rules that it was for the jury to say whether plaintiff was guilty of contributory negligence.¹⁸

The Supreme Court of Illinois rules that an instruction "that the rule of law as to negligence in children is that they are required to exercise only that degree of care and caution which persons of like age, capacity and experience might be reasonably expected to naturally and ordinarily use in the same situation and under the same circumstances, provided that the parents or persons having the control of such children have not been guilty of a want of ordinary care in allowing them to be placed in such circumstances," is proper, and does not conflict with an instruction that, if the children in question possessed the knowledge or ability of adults, the law would exact the same degree of care and prudence of them as of older persons.¹⁹

The Supreme Court of Pennsylvania holds that the presumption that a person killed at a crossing performed his legal duty of stopping, looking and listening before crossing a railroad track is overcome by evidence that he was struck by a moving train the instant he set foot upon the track, and that the view was unobstructed.²⁰

In Alabama the Supreme Court rules that the mere failure to keep a lookout for trespassers on a railroad track, elsewhere than at a public crossing or in a city or village, is not negligence.²¹

- ¹ Geo. Pac. R. Co. v. Wilkes, 6 South Rep., 31.
- ² St. Louis Bridge & Tunnel Co. v. People, 21 N. E. Rep., 348.
- ³ Ill. Cent. R. Co. v. Slater, 21 N. E. Rep., 375.
- ⁴ Mo. Pac. R. Co. v. Richmond, 11 S. W. Rep., 556.
- ⁵ Moran v. Ross, 31 Pac. Rep., 347.
- ⁶ Johnson v. Bait & R. Co., 17 Atl. Rep., 574.
- ⁷ Ellsworth v. M. N. & S. E. R. Co., 21 Pac. Rep., 632.
- ⁸ L. N. A. & C. R. Co. v. Beck, 21 N. E. Rep., 471.
- ⁹ Cox v. B. & W. R. Co., 42 N. W. Rep., 429.
- ¹⁰ L. N. A. & C. R. Co. v. Etzler, 21 N. E. Rep., 466.
- ¹¹ K. C. Ft. S. & G. R. Co. v. Bruge, 21 Pac. Rep., 589.
- ¹² Fisher v. Penn. R. Co., 17 Atl. Rep., 607.
- ¹³ Meloy v. C. & N. W. R. Co., 42 N. W. Rep., 563.
- ¹⁴ Stewart v. P. W. & B. R. Co., 17 Atl. Rep., 639.
- ¹⁵ Purdy v. R. W. & O. R. Co., 5 N. Y. Supp., 217.
- ¹⁶ Denver, S. P. & P. R. Co. v. Driscoll, 21 Pac. Rep., 708.
- ¹⁷ Callaghan v. D. L. & W. R. Co., 5 N. Y. Supp., 285.
- ¹⁸ Lewis v. N. Y., L. E. & W. R. Co., N. Y. Supp. 313.
- ¹⁹ Ill. Cent. R. Co. v. Slater, 21 N. E. Rep., 375.
- ²⁰ Penn. R. Co. v. Mooney, 17 Atl. Rep., 590.
- ²¹ Bentley v. Geo. Pac. R. Co., 6 South Rep., 37.

General Railroad News.**MEETINGS AND ANNOUNCEMENTS.****Dividends.**

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston, Concord & Montreal, semi-annual, 3 per cent., payable Nov. 1.

Boston & Maine, semi-annual, 5 per cent., payable Nov. 1.

New York, Providence & Boston, quarterly, 2½ per cent., payable Nov. 11.

Oregon Improvement Co., 1 per cent., on common stock payable Nov. 1.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fe, special, Topeka, Kan., Nov. 7.

Brooklyn, Bath & West End, annual, Brooklyn, N. Y., Nov. 14.

Buffalo, Rochester & Pittsburgh, annual, Rochester, N. Y., Nov. 18.

Central Michigan, special, Grand Rapids, Mich., Nov. 12.

Cour d'Alene Railway & Navigation Co., annual, Helena, Mont., Nov. 11.

East Tennessee, Virginia & Georgia, annual, Knoxville, Tenn., Nov. 20.

Knoxville Bell, special, at Knoxville, Tenn., Nov. 2, for the purpose of acting upon a proposed mortgage.

Grand Trunk, Georgian Bay & Lake Erie, annual, Toronto, Ont., Nov. 4.

Manhattan, annual, 71 Broadway, New York City, Nov. 13.

Montgomery, Tuscaloosa & Memphis, special meeting, Montgomery, Ala., Nov. 18, to vote on a proposed increase of the capital stock.

New York, Lake Erie & Western, annual, 21 Cortlandt street, New York City, Nov. 26.

New York & Northern, annual, 32 Nassau street, New York City, Nov. 13.

New York, Pennsylvania & Ohio, annual, Cleveland, O., Nov. 9.

Ontario, Carbondale & Scranton, special, Scranton, Pa., Nov. 4, to consider proposed mortgage to secure an issue of \$150,000 bonds.

Oregon & Transcontinental Co., special meeting, Portland, Ore., Nov. 5, to take action on the question, which has already been submitted to the directors, whether the capital of the company shall be reduced or the company shall be liquidated and go out of existence.

Philadelphia, Germantown & Norristown, annual, Philadelphia, Pa., Nov. 4.

Southwest Pennsylvania, special, Philadelphia, Pa., Nov. 14.

Spokane Falls & Northern, annual, Spokane Falls, Wash., Nov. 11.

Tennessee Midland, annual, Memphis, Tenn., Dec. 4.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meeting on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at Boston, at 7:30 p. m., on the third Wednesday in each month. The next meeting will probably be held at the United States Hotel.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at the Club rooms, No. 24 West Fourth street, Cincinnati, at 8 p. m., on the fourth Thursday of each month.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Engineers' Club of Philadelphia.

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officer for the company over 32 years, and in that time had sent nearly 100 "crooks" to state-prison on sentences ranging from 2 to 20 years.

—Mr. S. S. Thompson, General Manager of the Woodstock road in Vermont, and President and contractor of the Frankfort & Southeastern, died in Frankfort, Mich., Oct. 24, aged 66 years. He was a large railroad contractor, and built a part of the Grand Trunk, and was also a large stockholder in the Canadian Pacific and other railroad lines.

—Mr. John Crerar, senior member of the railroad supply firm of Crerar, Adams & Co., died in Chicago, Oct. 19, of heart disease. Mr. Crerar was a director of many corporations, among them the Chicago Telephone Co., Pullman Palace Car Co., Chicago & Alton Railroad and the Joliet & Chicago, now a leased line of the Chicago & Alton, and of which he was President.

—Mr. A. P. Tanner, Assistant General Freight Agent in Kansas City of the Atchison, Topeka & Santa Fe, has been appointed Assistant General Freight Agent of the system, with headquarters at Topeka. Mr. Tanner succeeds W. B. Biddle, who will remain in the company's employ. Mr. Biddle has been Assistant General Freight Agent since April 1, 1887, and was previously connected with the Atlantic & Pacific five years, as Chief Clerk, Assistant General Freight Agent and Division Freight and Passenger Agent. Mr. Tanner was General Agent of the Atchison, Topeka & Santa Fe, at St. Louis, before being transferred to Kansas City last May as Assistant General Freight Agent. He has been in the employ of the company 12 years.

—Mr. Henry S. Marcy, Traffic Manager of the Delaware & Hudson Canal Co., has been elected Vice-President and Acting General Manager of the Fitchburg. Mr. Marcy was appointed General Freight Agent of the Delaware & Hudson Canal Co., May, 1871, and in 1885 he became Traffic Manager. He was born in Vermont in 1837, and in 1858 became Master of Transportation of the Sullivan County Road in Vermont. He has since been successively Superintendent's Clerk, Master of Transportation and Acting Superintendent on the Rutland & Burlington, and General Freight Agent of the Rensselaer & Saratoga, resigning the latter position to become General Freight Agent of the Delaware & Hudson Canal Co.

—Mr. Marshall M. Kirkman's appointment as Second Vice-President of the Chicago & Northwestern is a notable instance of the winning of honor and position by merit alone in the service of one railroad. In 1857, when less than 15 years old, he became a clerk and telegraph operator on one of the smaller roads afterward consolidated under the present corporation, and he has never altered his allegiance. He has made himself known to all railroad men in all parts of the world by his treatises on the different departments of railroad accounting. To these works, and to his strong personal influence otherwise exerted, is due much of the progress toward clearness and uniformity in railroad clerical work. Few men so polemic and positive as Mr. Kirkman have so many warm friends and admirers.

ELECTIONS AND APPOINTMENTS.

American Refrigerator Transit Co.—E. C. Spaulding has been appointed General Agent, with headquarters at Atlanta, Ga., and A. W. Brooke, Acting Auditor, has been appointed Auditor vice Henry Sumner.

Atchison, Topeka & Santa Fe.—The company has created the new office of superintendent of car service and appointed C. W. Kounts to the position.

Brigantine Beach.—The officers of this New Jersey company are as follows: Samuel S. John McCutchen, President; Moritz Lippman, Vice-President and General Manager; James B. Van Woert, Treasurer; E. Clarence Miller, Secretary, and Edmund C. Stout, Chief Engineer. The address of all is Oceanville, N. J.

Cairo, Vincennes & Chicago.—At a recent meeting of the stockholders Thomas P. Bonfield, of Kaukaee, was elected President and J. C. Davie, of Cincinnati, Secretary.

Central Massachusetts.—The annual meeting of the company was held at Boston Oct. 30, and the following officers and directors were chosen for the ensuing year: President, S. N. Aldrich; Treasurer, G. F. Seymour; Directors, S. N. Aldrich, T. H. Perkins, Henry Woods, Lyman Hollingsworth, J. E. Smith, W. T. Parker, M. W. Richardson, E. S. Converse, C. E. Sweet, W. M. Gaylord, H. F. Hills, C. P. Darling.

Chicago Central.—The first board of directors of this Illinois road is as follows: Milton R. Wood, Charles W. Needham, Erwin E. Wood, William L. Moss and Edwin L. Waugh, all of Chicago.

Chicago & Northwestern.—Marshall M. Kirkman has been appointed Second Vice-President. The office of Comptroller will be abolished, and the duties of that position will be discharged by the Second Vice-President.

Chicago, Rock Island & Pacific.—Harry Monkhouse has been temporarily appointed Acting Master Mechanic of the Chicago, Kansas & Nebraska Division, in charge of car and locomotive departments, with headquarters at Horton, Kan. Richard McDougall has been transferred to his former position at Goodland, Kan. The office of Assistant General Master Mechanic and General Master Car Builder has been temporarily abolished.

Chicago, St. Paul & Kansas City.—J. McGuire, formerly Trainmaster, has been appointed Division Superintendent of the main line from Minneapolis to Elma.

Cleveland, Cincinnati, Chicago & St. Louis.—The annual meeting of the stockholders of the company was held in Cincinnati Oct. 30. The following directors, whose terms expired, were re-elected for three years: Alexander McDonald, Amos Townsend, Orlando Smith, James D. Arnett and Benjamin S. Brown.

Columbus, Shawnee & Hocking Valley.—This company has been chartered in Ohio, by the following directors of the Columbus & Eastern: D. S. Gray, P. W. Huntington, H. D. Turney, G. C. Hoover, Charles Parrott, F. J. Ricard, and W. E. Guerin, of Columbus, O.

Danvers.—At the annual meeting of the stockholders of these companies in Boston last week, the following board of directors was elected for both companies: George C. Lord, Amos Paul, William S. Stevens, Joseph S. Bieker, Samuel C. Lawrence, Richard Olney and Frank Jones. The lines are leased to the Boston & Maine.

Delaware & Otsego.—The following are the officers of this company: Hon. Thomas Cornell, of Rondout, N. Y.,

President; S. G. Dimmick, of Kingston, N. Y., Secretary and Treasurer, and E. B. Codwise, of Kingston, N. Y., Chief Engineer.

Dexter & Piscataquis.—At the annual meeting of stockholders, held in Dover, Me., Oct. 24, the old board of directors was re-elected, except Mr. Bacon, of Boston, who is succeeded by John F. Arnold, of Foxcroft.

Evansville & Terre Haute.—G. A. Hurd has been appointed Master of Transportation, vice G. W. Howard, resigned, and G. L. Hurst as was stated in our issue of Oct. 18.

Fayetteville & Albemarle.—The following are the officers of this company: President, John Blue, Aberdeen, N. C.; Vice-President, N. W. Ray, Fayetteville; Secretary, Z. W. Whitehead, Fayetteville; Treasurer, A. A. McKethan, Jr., Fayetteville, and W. C. McDuffie, Chief Engineer, Fayetteville, N. C.

Fitchburg.—At a meeting of the directors in Boston last week H. S. Marcy was chosen Vice-President, with the powers of General Manager.

Georgia Southern & Florida.—J. T. Hodge has been appointed General Passenger Agent at Maco, Ga.

Hants Central.—The directors of this Nova Scotia company are: Dr. Allan Haley, Windsor, N. S., President; H. T. Harding, Truro, N. S., Vice-President and Secretary; B. C. Madge, Boston, Treasurer; Martin Dickie, Truro; Isaac Douglass, Maitland; W. B. Frank, Boston, and E. A. Charles, Sussex, N. B.

Little Rock Cliff.—The officers are: W. T. Carpenter, President and General Manager, and Thomas Sanford, General Superintendent, of Grand Junction, Col., and E. B. Sawyer, Chief Engineer, of Montrose, Col.

Louisville, Evansville & St. Louis Consolidated.—The new board of directors has selected the following officers: D. J. Mackey, President; William Heilman, Vice-President, and W. P. Lewis, Secretary and Treasurer.

Memphis, Nashville & Atlantic.—This company has been incorporated in Tennessee by Lewis T. Baxter, H. S. Jackson, W. B. Ballard, F. P. McWhirter and J. C. Bradford.

Nantucket.—At the annual meeting held in Boston last week the following officers were elected: President, John Dorr; Secretary and Treasurer, J. H. Morton; Superintendent, F. H. Folger; Directors, the officers and E. H. Sheldon and J. W. Cartwright.

Ontario, Carbondale & Scranton.—The following officers have been elected: E. B. Sturgis, President; J. Fleming, Secretary and Treasurer; C. R. Pitcher, Assistant Treasurer. The board of directors consists of W. H. Richmond, J. Jermyn, O. S. Johnson, Edward Dolph, C. D. Simpson, Daniel Scurry, C. F. Spencer, F. P. Fowler, W. W. Paterson, John Kerr, J. Bustan and E. Clarkson. The company is a consolidation of the Scranton & Forest City, Forest City & State Line and Hancock & State Line roads, and when completed will be operated by the New York, Ontario & Western.

Pittsburgh, Beech Creek & New York.—Incorporated in Pennsylvania by Lorenzo Everett, Watsonstown, Pa., President; and C. D. Berger, M. A. Berger, Robt. H. McCormick, A. J. Kramer, D. A. Kramer and Peter Faust, directors, all of Watsonstown.

Pittsburgh, Canonburg & State Line.—The following directors have incorporated this company in Pennsylvania: C. Meyran, Pittsburgh, Pa., President; John B. Donaldson, S. Munnell, John T. Budke, and Wm. H. Paxton, of Canonburg, Pa.; E. H. Meyers, A. A. Succop, Jos. Abel, H. S. Duncan, H. H. Niemann and B. L. Wood, Jr., all of Pittsburgh.

Raleigh Springs.—John T. Fargasson, W. B. Mallory, John Gaston, West J. Crawford and James A. Omberg have chartered this company in Tennessee.

Southern Pacific.—The following appointments have been made: Richard Gray, General Traffic Manager, reporting to the Third Vice-President; C. F. Smurr, General Freight Agent; J. M. Crawley, Assistant General Freight and Passenger Agent, with headquarters at Los Angeles; William Sproule, Assistant General Freight Agent, at San Francisco, and A. D. Sheppard, Assistant General Freight Agent, at San Francisco.

Texas, Sabine Valley & Northwestern.—The annual meeting of the stockholders was held in Longview, Tex., Oct. 21. The following board of directors was elected: Charles M. Whitneys, Nelson S. Easton, R. J. Evans, Jas. M. Mobberly, Frank M. Larchar, Edwin S. Larchar, Andrew S. Taylor, J. W. Yates and T. F. Hull. At a meeting of the directors the following officers were elected: Nelson S. Easton, President; Richard J. Evans, Vice-President and General Manager; Edwin S. Larchar, Secretary and Treasurer.

Woodville & Southern.—Among the incorporators of this Wisconsin company are: E. S. Austin, Robert Clouston, A. J. Mumford, Chas. H. Adams and William H. Turner.

OLD AND NEW ROADS.

Allentown Terminal.—The company has executed a mortgage upon its property and issued \$450,000 of bonds, the proceeds of which will pay for the new station and other improvements. The bonds run 30 years and bear 4 per cent. interest, and are guaranteed by the Philadelphia Reading and Lehigh Coal & Navigation companies. The bonds have all been placed in New York by persons identified with these companies. The road furnishes terminal facilities to the Lehigh Valley and Philadelphia & Reading roads.

Baltimore & Drum Point.—It is claimed that all the grading of this road in Calvert County, Md., will be completed by Jan. 1. The commissioners of that county have agreed to sign the bonds for the \$100,000 voted the company, the bonds being deposited in Baltimore until the road is in operation between Baltimore and Drum Point, 80 miles. The commissioners of Anne Arundel County still refuse to pay the \$200,000, or any part of it, which the company claims is due it.

Baltimore & Eastern Shore.—Grading is completed on the 17 miles from Easton, Md., west to Eastern Bay, and it is claimed that the tracklaying on this section will be finished this month. Work is making good progress on the 40 miles from Easton southeast to Salisbury. The section from Salisbury east to Ocean City, Md., is completed and in operation, and the entire line across the eastern peninsula of Maryland is expected to be opened for traffic early next spring. A ferry connection of 11 miles will be made across Chesapeake Bay to

the Annapolis & Baltimore Short Line road, which gives an entrance to Baltimore. Godeffroy & How, of Easton, are the contractors. Joseph B. Seth, of Easton, is President.

Birmingham, Jackson & Kansas City.—It is stated that the Chesapeake, Ohio & Southwestern has agreed to build and operate this road from Jackson, Tenn., northwest to a connection with its own road at Hysburg or Newbern, a distance of about 40 miles, if the company is voted a subsidy of \$175,000 along the route.

Blue Mountain Mineral.—Ground was broken at Anniston, Ala., last week, and it is stated that construction will be continued until the road is finished from Anniston, Ala., to a connection with the East & West, of Alabama, about 20 miles from Anniston, which, it is claimed, will be done in three months. McDonald & Campbell have the contract. J. A. Gaboury, Jacksonville, Ala., is President.

Bowling Green Northern.—The Bowling Green Contract Co. has been organized at Louisville, Ky., for the purpose of building the Bowling Green Northern, from Bowling Green, Ky., to a point on the Ohio River, at or near Owensboro, Ky.

Brierfield, Blocton & Birmingham.—About 1,500 men are working on this road, and over one-third of it is completed. Tracklaying will begin Nov. 1. It is an extension of the East Tennessee, Virginia & Georgia, and is being built from a point on that road near Montealeo, Ala., northerly to Bessemer, with a branch westerly to Blocton, Ala. The line will be about 53 miles long. The work is very heavy, about a third of it being solid rock. The grades are 1 1/2 per cent., the curves are eight degrees. There are three iron viaducts, each of an average depth of 500 ft. There is one tunnel 300 ft. long. Aldrich, Worthington & Co., of Birmingham, Ala., are the contractors for grading. The company's own forces will lay the track. Cary A. Wilson, 10 Wall street, New York, is President, and A. B. Shepherd, Office Building, Birmingham, Ala., is Chief Engineer.

Brigantine Beach.—Coffin & Co., 35 Broadway, New York, have been awarded the contract for building this New Jersey road, and tracklaying on the first two miles has already been finished. The road is being built from Pomona Station, on the Camden & Atlantic, to the north side of Pond, at Oceanville; thence to the head of Turtle Cove, and thence to Brigantine Beach. The length is 13 miles. The grading will be very light. The maximum curve will be three degrees. There will be 9,050 ft. of trestling. Drawbridges will be erected over the navigable streams. Edmund C. Stout, of Oceanville is Chief Engineer.

Brockville, Westport & Sault Ste. Marie.—It is understood that the Grand Trunk is negotiating for this road, which is chartered to construct a line from Brockville, Ont., on the St. Lawrence River, to Sault Ste. Marie. In 1885 the Dominion Parliament voted a subsidy of \$3,200 per mile, on 40 miles, from Brockville to Westport, Ont., which is now completed. Last session a further subsidy of \$3,200 per mile, for 20 miles, from Westport to Palmer Rapids, was voted. The idea is to give the Grand Trunk another line to the Sault Ste. Marie.

Cairo, Vincennes & Chicago.—The stockholders of the road will hold a meeting at Paris, Ill., Dec. 28, 1889, to perfect the consolidation with the Cleveland, Cincinnati, Chicago & St. Louis. It is proposed to enter into a close traffic agreement with that road, to execute a first mortgage on all its property rights and franchises, to secure the payment of a series of the corporate bonds of the "Big Four," amounting to \$5,000,000, also to cancel the \$5,000,000 mortgage given by the Cairo, Vincennes & Chicago to Anthony Thomas, trustee, June 29, 1889, for the purchase price of the road.

Chesapeake & Ohio.—The directors state that it is expected that during the coming year the Richmond & Allegheny will be formally incorporated into the system. There are then to be issued as a consideration for it and to provide for liens upon it \$5,000,000 first-mortgage bonds, \$1,000,000 to bear four per cent., \$5,000,000 to bear two per cent., for five years from Jan. 1, 1889, and four per cent. thereafter; \$1,000,000 second-mortgage bonds bearing two per cent. for one year, three per cent. for the second year and four per cent. thereafter; also \$1,000,000 first preferred stock and about \$6,000,000 common stock, by which amounts the stock will be increased. In the reorganization \$4,000,000 of the new consolidated five per cents were allotted to pay for improvements. The issue of \$1,500,000 of these bonds has been recently authorized. The stockholders, at the annual meeting last week, voted to ratify the purchase of the Richmond & Allegheny and the plan of reorganization.

Chicago, Burlington & Quincy.—The gross earnings of the company for September were \$2,495,224, an increase over those for the corresponding month last year of \$20,080; the net earnings were \$1,152,578, an increase of \$164,130. From Jan. 1 to Sept. 30 the gross earnings were \$19,126,957, an increase of \$2,538,645 over the corresponding period of 1888, and the net earnings were \$7,017,357, an increase of \$3,700,283. The gross earnings for September of the properties controlled by the company, but not included in the above, were \$630,955, an increase of \$97,122, and the net earnings \$257,753, an increase of \$71,515. From Jan. 1 to Sept. 30 the gross earnings of these properties were \$5,308,711, an increase of \$1,190,805, and the net earnings \$1,617,162, an increase of \$843,671.

Chicago, Rock Island & Pacific.—The extension of the southwestern branch from Pond Creek, recently completed to Kingfisher, I. T., is being built south of the latter place to Fort Reno. The road crosses the dividing line between Oklahoma and the Indian Reservation at a point some miles south of Kingfisher. When the grading forces reached this point last week they were prevented by United States troops from proceeding any further or crossing the line.

Cincinnati, Washington & Baltimore.—The Purchasing Committee, which bought the road at judicial sale some time ago, has assumed control of the property lately in the hands of receivers, and announced the appointment of Gen. Orland Smith as agent. This arrangement will continue until the purchasers can organize the new company to own the road. An arrangement has been made with the Baltimore & Ohio, whereby holders of Cincinnati, Washington & Baltimore reorganization receipts, representing 4 1/2 per cent. first-mortgage bonds, will this week receive interest on deposited bonds from May 1, 1889, to Jan. 1, 1890.

Cleveland, Cincinnati, Chicago & St. Louis.—At the annual meeting of stockholders, held in Cincinnati, Oct. 30, President Ingalls said: On June 27 the Cleveland, Columbus, Cincinnati & Indianapolis, the Indianapolis & St. Louis, and the Cincinnati, Indianapolis & St. Louis

companies were consolidated, and on July 1 the accounts and operations of the three companies were merged into the consolidated company. Owing to the difficulty of combining the reports of the various companies and making a comprehensive statement the directors have thought it advisable to omit the usual form of annual report. The gross earnings of the entire system for the year ending June 30, 1889, were \$11,453,992. The operating expenses were \$7,394,171, and the net earnings \$4,059,820. The fixed charges of the new company for bond interest, rental and taxes, the latter being estimated, are \$2,871,674. The Cairo, Vincennes & Chicago is operated under a temporary arrangement by which the company pays \$208,000 a year. It is expected that this contract will be made perpetual, if approved by the stockholders at the coming annual meeting, and \$5,000,000 of 4 per cent. bonds issued in payment for the road, and rentals of \$8,000 a year assured. By the purchase of additional cars a large saving in expenses can also be made, as the consolidated companies paid out last year in mileage to foreign roads about \$300,000, and the interest at 6 per cent. on \$5,000,000, while the expenditure of probably \$1,500,000 would carry the balance to the other side of the ledger. Altogether, for new equipment, terminals, sidings and double track it would seem very desirable that a fund of \$2,500,000 should be provided, and this subject shall have the consideration of your directors at an early date.

A road is being built by J. C. Laney from Laney, Ala., to Piedmont, a distance of about 20 miles. One or more locomotives will be wanted.

Columbus & Cincinnati Midland.—An offer has been made to the holders of the first mortgage bonds of the company, on behalf of the Baltimore & Ohio, that the latter company will guarantee the principal and interest of the bonds, provided the interest is reduced to four per cent. per annum. The Columbus & Cincinnati Midland is the Baltimore & Ohio connection between Columbus and Cincinnati, and has a freight contract with the Baltimore & Ohio, the Ohio Central and the Cincinnati, Washington & Baltimore companies, running 50 years. It is the shortest line between Columbus and Cincinnati, is well built and laid with steel rails, and has been used since its completion by the Baltimore & Ohio for fast passenger express business between Pittsburgh, Cincinnati and St. Louis. According to the reports of the officers for several years past the road has earned between five and six percent. on its first mortgage six per cent. bonds, and will do as well this year. The mortgage is for \$2,000,000. In view of the above facts, the bondholders have declined the proposition, and have united to protect their interests. The bondholders insist that they shall not be asked to take a less rate of interest than that which, according to the reports of the officers, has been earned the past three years. There have been rumors recently that several roads other than the Baltimore & Ohio are anxious to secure the line.

Columbus, Shawnee & Hocking Valley.—The articles of incorporation have been filed in Ohio to build a connecting line from a point on the Columbus & Eastern, near Sallito, Perry County, to a connection with the Shawnee & Muskingum River, near Sager's, in Perry County, a distance of about 10 miles. It is claimed that the road will be built immediately, and when completed will be absorbed by a new company, to include also the Columbus & Eastern and the Shawnee & Muskingum River road. The incorporators of this line are interested in the Columbus & Eastern.

Danville & East Tennessee.—An engineering force has been organized to begin at once the survey of the road from Danville to the coal fields of Southwest Virginia. The route will be by Madison, N. C., or Patrick Court House, Va., to Damascus; thence to Bristol, Abingdon or Johnson City, Tenn. The road is the western extension of the Atlantic & Danville, and the City of Danville recently voted \$200,000 to aid in its construction.

Darien Short Line.—A quantity of rails has arrived at Bellville, Ga., for this road, and tracklaying will commence immediately between Bellville and Walthourville, Liberty County, on the Savannah, Florida & Western. The road has been graded from Darien, on the Atlantic Coast northwest, for over 40 miles toward Reidsville, Tattnall County.

Fayetteville & Albemarle.—It is claimed that grading on this road will begin in December. It is projected to extend from Fayetteville, N. C., northwest toward Albemarle, Stanley County, for 44 miles. The grading is very light, with very little work. Parties in Philadelphia are financially interested in the road. Z. W. Whitehead, of Fayetteville, is Secretary.

Fernandina, Jacksonville & St. Augustine.—This company has been chartered in Florida to build a road from St. Augustine to Jacksonville, and a ship canal from the latter place to Fernandina, about 25 miles.

Florida Central & Peninsula.—The contracts have been let to S. Walker for building the extension of this road from Plant City to Tampa, Fla., a distance of 22 miles. The work will not be difficult. The maximum grades are 45 ft. per mile, and the maximum curves are 3 degrees. J. W. Bushnell, Jacksonville, is Chief Engineer.

Galveston, Houston & Henderson.—The Receivers of the International & Great Northern have filed a suit at San Antonio, Tex., against the Galveston, Harrisburg & San Antonio and the Southern Pacific companies. The petition alleges that on Nov. 26, 1881, C. P. Huntington and Jay Gould entered into a written contract by which the Galveston, Houston & Henderson was to be used and operated jointly between Galveston and Houston upon the payment of six per cent. on \$10,000 per mile of track. The contract was modified Feb. 18, 1885, by which the Galveston, Houston & Henderson road was to be operated by the defendants. The present suit is to recover the amount for the operation of the disputed track from May 31, 1888, to June 30, 1889, amounting to \$133,500, to which is to be added the sum of \$8,000 for interest on the deferred payments, making the total claim \$141,500.35. The plaintiffs allege general damages of \$200,000 on account of the failure and refusal of the defendants to settle the amounts claimed. The first mortgage bonds of the road are guaranteed principal and interest by the International & Great Northern.

Georgia Southern & Florida.—The road is now opened for business from Macon and Valdosta, Ga., to Lake City, Fla., 212 miles south of Macon, where the line connects with the Florida Central & Peninsular, forming part of a short route from the West and Northwest to points in Florida.

Grand Tower & Cape Girardeau.—The stockholders have authorized the issuance of six per cent. mortgage bonds to the amount of \$375,000 on the property and franchises of the company.

Harrisburg Terminal.—It is stated that the Philadelphia & Reading has obtained nearly all the right of way needed for building this road from Bowmandale, Cumberland County, where it will connect with the Harrisburg & Potomac, to Harrisburg, where it is proposed to build a bridge over the Susquehanna River to the Philadelphia & Reading tracks. The new connection will give the latter company a route to the West, as the Harrisburg & Potomac connects with the Western Maryland road at Shippensburg, and that line connects with the Baltimore & Ohio at Hagerstown, Md.

Harvey & Salisbury.—It is reported at Ottawa that the Dominion government will abandon the construction of this line, which it was proposed to build as a public work in order to reduce the railroad distance between Montreal and Halifax. Government engineers have made a survey of the line, but the Temiscouata road also made surveys for a proposed extension from Edmundston to Moncton, N. B., on the Intercolonial, to give the Grand Trunk a through Canadian route to the Atlantic seaboard. The company has asked a subsidy for the extension which would parallel the Harvey & Moncton road if built, and as the latter line would only shorten the distance between Montreal and Halifax 17 miles, while it would necessitate an expenditure of \$2,000,000, which would have to be paid out of the Dominion treasury, it is very probable that the line will be abandoned.

Huron, Chamberlain & Black Hills.—The locating survey for this road will be commenced immediately between Huron and Chamberlain, S. D., 79 miles. The preliminary survey for this section of the road has just been completed. The present proposed terminus is Rapid City, S. D., about 200 miles beyond Chamberlain. The average cost of grading will be about \$3,000 per mile. The soil is easily worked, and there will be no rock work or timber clearing to do. The maximum grades are 35 ft. per mile, and maximum curves are 3 degrees. The grading will probably begin in the spring. The towns of Huron and Chamberlain have voted a tax in aid of the road, as have also some intermediate points. The former town has a population of 2,500 and the latter has a population of 6,000. The country intervening is very fertile, with no railroad connections at present. E. T. Harmston, of Alpena, S. D., is Chief Engineer, and T. L. Blank, formerly Resident Engineer of the Minneapolis, St. Paul & Sault Ste. Marie, is Assistant Engineer.

Illinois Central.—The company has issued a corrected statement of the net traffic earnings for the two months ended Aug. 31, 1889, and 1888 (August, 1889, estimated):

	1889.	1888.	Inc. or Dec.
Gross earnings.....	\$2,238,883	\$1,994,762	I. \$244,121
Oper. expen. and taxes. 1,379,987		1,264,204	I. 105,783
Perm. expenditures.....	20,367	28,955	D. 8,588
Total.....	\$1,391,351	\$1,293,150	I. \$98,195
Net earnings.....	847,529	611,603	I. 235,926

* Including the earnings and expenses of the Memphis Division (100 miles).

The following statement shows the net earnings for the three months ended Sept. 30, 1889 and 1888 (September, 1889, estimated):

	1889.	1888.	Inc.
Miles.....	2,275	1,953	322
Gross earnings.....	\$3,531,392	\$2,869,687	\$661,615
Oper. expen. and taxes. 2,078,227		1,925,700	152,527
Perm. expenditures ..	54,926	49,252	5,674
Total.....	\$2,133,133	\$1,974,352	\$158,201
Net earnings.....	1,398,149	894,735	503,414

* Increased mileage consists of Chicago, Madison & North (222 miles) and the Memphis Division (100 miles).

Kansas City, Watkins & Gulf.—Grading is progressing rapidly on the section under construction from Lake Charles, La., north. The line is covered with forces as far as the 28th mile.

Kansas Pacific.—A release, signed by Jay Gould and Russell Sage, as trustees, was filed in Topeka last week. It releases to the Union Pacific certain lands embraced in the first consolidated mortgage of this road dated May 1, 1879. The release was signed by order of Judge Brewer, of the United States Circuit Court.

Kennebec Central.—M. O'Neil, of Cumberland Mills, Me., has been awarded the contract for the grading and masonry on this road from Randolph to Togus, Me., five miles. Grading has been commenced, and it is expected to have it completed this fall, but no track will be laid before spring. Frederic Danforth is Chief Engineer and O. H. Tripp is Assistant Engineer, both of Gardiner, Me.

Kentucky Union.—About 1,500 men are at work constructing the extension of this road to Jackson, Ky., and half a mile of track is being laid each day. Fifty miles of the road is now built, and it is expected to have 96 miles finished by next March. The road is projected to extend from Lexington, Ky., to Big Stone Gap, Va., a total distance of 160 miles. The work is heavy, both in tunneling and in open work. Mason, Hoge & Meyer, Frankfort, Ky., are the contractors. Ten iron bridges over 100 ft. long will be necessary, and there will also be seven tunnels within the first 90 miles. George Dole Wadley is General Manager, and R. T. Macdonald is Chief Engineer, both at Lexington, Ky.

Lake Temiscamingue Colonization.—Work of construction on this line, which is being constructed to a Jesuit colony at Lake Temiscamingue, Que., is being pushed forward rapidly and the road will be opened for traffic early next spring. The company receives a subsidy of \$71,600 for 20 miles of road from the Dominion government. It is proposed to extend the road south to Mattawa, Ont., on the Canadian Pacific.

Little Book Cliff.—Grading has been commenced on this Colorado road and two miles have been completed. About 25 men are at work, no contractors being employed. The road is being constructed from Grand Junction, north to the Little Book Cliffs, about 12 miles. The work is easy, the grades being five per cent. The maximum curve will be 30 degrees. There will be six or eight wooden bridges, but none of iron. The principle traffic of the road will be handling coal and stone from fine quarries as well as some summer excursion business to the mountains. W. T. Carpenter, Grand Junction, Col., is President and General Manager, and E. B. Sawyer, Montrose, Col., is Chief Engineer.

Little Miami.—Judge Taft, in the Superior Court in Cincinnati, has given judgment by default in the suit of this company against the Pennsylvania Company brought to collect the guaranteed dividend on the Little Miami shares, which the Pennsylvania Company refuses to pay, on the ground that the Little Miami had not performed its contract as to betterments. The amount of the judgment is \$147,311, and to pay the judgment an

order of sale has been issued for shares of stock held by the plaintiff by garnishee.

Louisville, New Orleans & Texas.—This company announces that what has heretofore been known as the Bolivar Loop Branch Line, from Lamont to Rosedale, Miss., has been extended northward through Bolivar and Coahoma Counties, Miss., to a junction with the main line at Coahoma Station, 63 miles south of Memphis. The Lake Washington Branch has also been extended from Hampton, Miss., to Riverside Junction, on the main line, two miles north of Rolling Fork, Miss. These new lines together with the Bolivar Loop and Lake Washington Branches, and that portion of the Arkansas City Branch from Lamont to Wilczinski, will hereafter be known as the Riverside Division.

Macon & Birmingham.—J. S. McTighe, of Memphis, Tenn., have been awarded the contract for building the first section of this road from Macon, Ga., west toward Birmingham, Ala., which is to be the terminus of the line.

Memphis, Nashville & Atlantic.—This company has filed a charter in Tennessee to construct a road from Nashville to Glen Mary, in Scott County, with a branch from the main line near Johnson Stand to some point on the Tennessee River in Rhea County. The company retains the right to construct branch roads not to exceed 30 miles in length in Overton, Putnam, Cumberland and Fentress counties.

Missouri, Kansas & Texas.—The extension of the Dallas and Waco branch from Lancaster to Waxahachie, Tex., 16 miles, was opened for passenger business last week.

Judge Brewer, of the United States Court, has restrained the Missouri Pacific, the Fort Scott, Wichita & Western and the Fort Scott Belt Terminal companies and the city of Fort Scott, Kan., from holding or interfering with a tract of two and a half acres of land between Stanton street and National avenue, used as the yards and station grounds of this road in Fort Scott. The Missouri, Kansas & Texas came into possession of this land Dec. 6, 1872, but recently the Missouri Pacific and the Fort Scott, Wichita & Western endeavored to take possession of it, and removed several tracks, which the company replaced, and then obtained Judge Brewer's order. The city of Fort Scott claims that the ground does not belong to the company, as it is part of an unopened street.

Missouri Pacific.—The Kansas & Arkansas Valley Division has been completed between Wagoner, I. T., and Coffeyville, Kan., 82 miles, and the train bearing Jay Gould and the inspection party was the first one to pass over the completed road. The line will not be opened for regular passenger business for some time, but when it is, it is stated that a fast passenger train will be put on between Kansas and Little Rock. The extension completes a new connection between the Missouri Pacific and the St. Louis, Iron Mountain & Southern.

The company is building a road from McGehee, Ark., to Alexandria, La., connecting the Little Rock, Mississippi River & Texas road with the Texas Pacific.

Monongahela River.—The Parkersburg Improvement & Construction Co., of Fairmont, W. Va., which is building and equipping this line, will have all the track laid and ballasting completed by Jan. 1, when it will turn the road over to the railroad company for operation. Grading has been finished and the ballasting is more than half done. The road extends from Fairmont, W. Va., southwest to Clarksburg, W. Va., a distance of 32 miles, following the West Fork of the Monongahela River, and was put under contract in April last. The work is quite heavy and has maximum curves of 10 degrees and maximum grades of 30 ft. per mile. The contractors for grading are Messrs. Ryan & McDonald, of Baltimore, T. J. Steers & Co., of Parkersburg, and W. F. Stanley & Co., of Clarksburg. At the crossing of the West Fork River there is a through span bridge of 150 ft., with two 70 ft. deck girder approaches; at Booth's Creek, two 70 ft. deck girders; at Koon's Run, 40 ft. deck girders, and at Simpson's Creek a 100 ft. through span bridge. Ex-Senator J. N. Camden is President of the railroad company and Wm. Harry Chief Engineer. J. N. Camden, Jr., is President and Treasurer of the Construction Company, and J. A. Fickenger is Chief Engineer. The offices of both companies are at Fairmont.

Monterey & Northwestern.—W. T. Robertson has been awarded the contract for building this extension of the Monterey & Mexican Gulf road from Monterey, northwest about 65 miles, to Vendito. The contractor will soon commence work at the Vendito end, and expects to have the line completed in six months. Connection will be made at Vendito with the Mexican International, which will give the Monterey & Mexican Gulf a standard gauge connection to the United States.

Montreal & Western.—In 1888 the Dominion Parliament voted this company a bonus of \$301,270 for 70 miles of road, from St. Jerome, Que., to the Desert. It is now stated by one of the directors that the contract for the first 30 miles will be let shortly. The road is located from St. Jerome, nearly parallel with the North Shore line. The route is south of Lake Nomanang, crosses the Du Lievre, about 75 miles north of Buckingham, connecting with the Gatineau Valley road near Maniwaki. The Canadian Pacific, it is stated, has agreed to lease each section as it is built, and to lease the whole line as it is completed, for five years, with the option of purchase at the end of that time.

Mt. Pleasant & Seaview City.—The survey has been completed by Simons & Huger, of Charleston, S. C., from Hog Island to Seaview City, about nine miles. A ferry is to be run between Charleston and Hog Island. There will be a pile bridge 5,022 ft. long, with roadways and a footway, and a channel draw 143 ft. long. J. P. Kennerly is President and J. S. Schiefer is Secretary and Treasurer. The office is at 110 East Bay, Charleston.

New Roads.—Mr. Bender, of Montreal, who is now in England in the interest of the proposed railroad bridge across the St. Lawrence River at Quebec, and the projected road to the Straits of Belle Isle, cabled last week that he had succeeded in forming a syndicate for carrying out the scheme. The Dominion Parliament will be asked to grant a subsidy. In connection with this scheme is the project of filling in the Straits of Belle Isle so as to turn the flow of the Arctic current from the Gulf of St. Lawrence.

A local company is being organized at Topeka and Pittsburgh, Kan., to build a road from Pittsburgh northwest to Topeka, a distance of about 125 miles, over the following proposed route: From Pittsburgh through Farlington, Crawford County, Ottawa, Redfield, Mapleton, Blue Mound, Greely and Ottawa to Belvoir or Clinton, and from there to Topeka.

Northern Pacific.—It is expected to complete the extension of the Central Washington from Davenport to Almira, Wash., 40 miles, this week. For the present the line will be operated by the construction department.

Ohio & West Virginia Southern.—Right of way is being secured for this road, which it is proposed to build from Marietta, O., southeast via Willow Island, Cornwallis, Harrisville and Glenville, to Braxton, W. Va., a distance of about 75 miles. Construction work will be light, the grades and curves being easy. The route is through a good timber and mineral country. T. W. Moore is President and W. M. Morse is Vice-President, both of Marietta, O.

Orange County.—It is expected that tracklaying on this road will be completed this week. The line extends from Greycourt to Burnside, N. Y., 10 miles, connecting at the former place with the Central of New Jersey, through its leased line the Lehigh & Hudson River road, and at the latter place with the Central New England & Western.

Oregon & Washington Territory.—On the Waitsburg extension the grading has been finished to Dayton, Wash., 33 miles from Walla Walla. The track is laid from Walla Walla to Dixie, but there is still a large rock cut to complete, above Dixie, before rails can be laid to Dayton.

Pacific Short Line.—Work on the line was stopped suddenly about a month ago after the rails had been purchased, but it will be resumed again within 10 days, and the 110 miles already graded will be finished and put in operation. E. P. Reynolds & Co., who built this section, have also been awarded the contract for grading, bridging and tracklaying on the section between Plainview and O'Neil, a distance of 45 miles, the locating survey for which has just been completed.

Pennsylvania.—The surveys have just been completed for a new line across Bucks and Montgomery counties from Norristown, Pa., on the Schuylkill River, northeast by east, to Morrisville, on the Delaware River, opposite Trenton, a distance of about 30 miles. The new line avoids Philadelphia, and, it is stated, will be 20 miles shorter between Trenton and Norristown than the present line.

Surveys are still in progress between Montgomery and Williamsport, Pa., along the West Branch Canal, which was partially destroyed in the June flood. It is thought the canal may be abandoned at this point, and a new road built on its site, giving the company a continuous line on the left bank of the West Branch of the Susquehanna River, avoiding crossing the river twice in a distance of 16 miles.

Pennsylvania, Poughkeepsie & Boston.—The road was this week opened for traffic from Pen Argyl, Pa., to the eastern terminus at Pine Island, N. Y. Two trains will be run daily each way.

Philadelphia & Reading.—The earnings of the railroad for the month of September, 1889, as compared with same month of 1888, are shown in the following table:

Gross receipts.....	\$1,801,956	\$1,832,696	D.	\$30,740
Expenses (ex. rent and interest).....	916,192	876,474	I.	39,718
Net profit.....	885,764	956,222	D.	70,458
Profit from Dec. 1 to Oct. 1.....	\$6,450,777	\$7,158,408	D.	\$707,631

Philadelphia & Seashore.—The officers of the company say that the contracts for this road will be let in sections, and that the first one may be awarded in two weeks. The road is to extend from Winslow Junction on the Atlantic City road to Cape May, a distance of 54 miles, with a branch to Sea Isle City, a distance of nine miles. The work will be generally light. There will be a number of wooden bridges, but none of iron. The company proposes to issue 20-year five per cent. bonds, but no arrangements have yet been made for placing them. Charles W. Potts is President, and James E. Taylor, of Cape May, N. J., is Secretary.

Pittsburgh, Beech Creek & New York.—This company has been incorporated in Pennsylvania to construct a road from a point near Mill Hill, Clinton County, thence through Centre, Clearfield, Jefferson, Indiana, Armstrong, Clarion and Butler counties to Butler, a distance of 150 miles. The capital stock is \$1,500,000. Lorenzo Everett, of Watsonstown, Pa., is President.

Pittsburgh, Canonsburg & State Line.—This company has filed a charter in Pennsylvania to construct a road to commence in Pittsburgh, and to extend through Canonsburg, Washington County, Pa., to a point on the line between the states of Pennsylvania and West Virginia, at or near Buffalo Creek, a distance of about 40 miles. The capital stock is \$450,000 in 9,000 shares. The line is to form part of the Wheeling, Wellsburg & State Line Road. C. Meyram, of Pittsburgh, is President.

Pittsburgh, Shenango & Lake Erie.—A bill has been filed in the United States Circuit Court at Pittsburgh by the Pittsburgh, Butler & Shenango Railroad, asking for the appointment of a receiver for the Pittsburgh, Shenango & Lake Erie pending its litigation against the latter company. The bill alleges that the defendant company contracted to operate the plaintiff's road and pay to it the net earnings monthly; that it has not carried out this contract, and that in addition to the net earnings due it there is also \$577,704 due. The plaintiffs also allege that the parties to whom the defendant company is indebted for its cars and equipments threaten to bring suit to recover, and that if judgment is secured by them the plaintiff will be seriously embarrassed. F. W. Hindekoper, of Meadville, Pa., was appointed Receiver.

Pueblo, Silver Cliff & Wet Mountain Valley.—This company has been incorporated in Colorado to build a road from Pueblo to Silver Cliff, in Custer County, a distance of about 70 miles, via Beulah and Red Creek Springs, in Pueblo County. A survey has already been started.

Qu'Appelle, Long Lake & Saskatchewan.—Fully 2,000 men and 650 teams are now employed on the construction of this road. Since work was started, Aug. 22, about 50 miles of track has been laid and surfaced, and over 120 miles has been graded. It is intended to have the entire 230 miles of the road completed in September, 1890. The line is being built from Regina, the capital of the Northwest territories, in a northwest direction to a crossing of the South Saskatchewan River, near Surkatoot, thence north-northeast to Prince Albert, in the North Saskatchewan. The whole line is now under contract with the exception of a proposed branch to Battleford, Saskatchewan. The maximum grades are 53 ft. per mile, and the maximum curvature is five degrees. The contract for the entire line, including engineering, grading, tracklaying, surfacing, bridging, stations, etc., and, in

fact, completing the road ready for operation, has been let to James Ross, Windsor Hotel, Montreal. There are no tunnels and only one large bridge, about 1,300 ft. in length, over the Saskatchewan River. The contractor has purchased rolling stock for construction purposes. The company has a bonded debt of \$15,000 per mile guaranteed for six years. It also has a land grant of 6,400 acres per mile. The bonds were placed on the English market by Messrs. Morton, Rose & Co., of London. The line, when completed, will be operated by the Canadian Pacific. The President is Hon. D. A. McInnes, of Hamilton, Ont., and the Chief Engineer is Hugh D. Lumsden, Regina, Assinaboia.

Raleigh Springs.—This company has been chartered in Tennessee to build the proposed road from Memphis east to Raleigh Springs, about 12 miles.

Roanoke & Southern.—Grading is in progress between Walnut Cove, N. C., and Martinsville, Va., 43 miles, and it is stated that it will be completed by Jan. 1 next. Tracklaying will commence in a few days on a section from Walnut Cove north to Madison, N. C., 13 miles. The company is now operating 18 miles, from Winston-Salem to Walnut Cove, where it connects with the Cape Fear & Yadkin Valley road. Breen, Feely & Newby, of Martinsville, are the contractors. G. W. Maslin, Winston, N. C., is Superintendent.

Rochester & Glen Haven.—This road has received permission from the New York State Railroad Commissioners to suspend the running of trains between Nov. 15 and May 1. The line was completed this summer, and extends from Rochester to Glen Haven, on Irondequoit Bay, six miles, where a hotel has been built and grounds for excursion parties laid out.

St. Joseph Terminal.—Several years ago this company was enjoined by the Chicago, Burlington & Quincy from laying its tracks across those of the latter company on Fourth Street in St. Joseph, Mo., and the case has been in litigation ever since, and was only settled last week. By the agreement the company is to build a track from its lower yards to the uptown station, and will erect a freight depot 500 x 100 ft. The company affords the Union Pacific, the St. Joseph & St. Louis, the St. Joseph & Grand Island, the Chicago, Milwaukee & St. Paul and other roads, with terminal facilities in St. Joseph.

St. Louis Central & Western.—This company is being organized to succeed the St. Louis, Cable & Western, now in a Receiver's hands. The company will ask the St. Louis City Council for a franchise to extend the cable line from its present terminus along Morgan street to Union avenue and across Union avenue to Forest Park. The application is expected to be strongly opposed by residents along the route of the proposed extension.

St. Louis, Indianapolis & Eastern.—Articles of incorporation of this company, with a capital stock of \$6,800,000, have been filed in Illinois. The incorporators and first board of directors are Horatio H. Gardner, Thomas B. Rice, John Prindiville, John L. Stockton and Ira C. Wood, all of Chicago. The line when built will be operated as a part of the system controlled by D. J. Mackey.

South Brunswick.—The last rail on this road was laid near Brunswick, Ga., Oct. 23, and the first train from Waynesville, on the Brunswick & Western south-east to Brunswick, a distance of 17 miles, was run through that day. It is stated that work will soon begin on an extension northwest from Waynesville.

Southern Kansas.—The Kansas Board of Railroad Commissioners have condemned nearly 50 miles of the Southern Kansas, a branch of the Atchison, Topeka & Santa Fe, and directed the company to at once repair the road between Holliday and Ottawa. The board declares that the dangerous condition of the line demands immediate attention.

Suncook Valley Extension.—This five-mile extension of the Suncook Valley from Pittsfield to Barnstead Center, N. H., was formally opened Oct. 24. The preliminary survey for the second section from Barnstead Center to the Gilmanston Iron Works, a distance of six miles, has been completed.

Tehuantepec.—A large quantity of construction material for this road is reported to have arrived at Coatza-coalos, and it is also stated that a large force is now grading the line. The most difficult work on the road is at a place called Chinela, where three tunnels will have to be driven.

Toledo, Columbus & Cincinnati.—Tracklaying is to begin this week on the extension from the terminus south of Findlay, O., south to Kenton, about 20 miles. Grading is making very rapid progress. J. Casement is the contractor and J. C. Williams is Engineer in Charge.

Utica & Unadilla Valley.—The grading has been completed for eight miles, and work is in progress by a force of 120 men. William H. Adams, of New York, is the contractor. The work is light. The maximum grades are 32 ft. per mile, and the maximum curves are five degrees. The road is being built from Bridgewater, N. Y., to New Berlin, N. Y., passing through the towns of Unadilla Forks, Leonardsville, West Edmeston and South Edmeston. The distance is 20 miles. R. F. Clarke, 146 Broadway, New York, is Secretary, and D. C. Culver is Chief Engineer and M. S. Davis, Resident Engineer at Bridgewater, N. Y.

Vanegas, Cedral & Matehuala.—This road was recently opened for freight traffic from Vanegas, on the Mexican National, to Cedral, 17 miles, in the state of San Luis Potosi, Mexico. Passenger trains on this section will begin running about Nov. 1. It is expected to have the line completed to Matehuala, 12 miles from Cedral, early next spring. The company proposes to extend its line from Rio Verde, in a rich agricultural district, to form a junction with the Tampico branch of the Mexican Central, and from there to Tula, Tamaulipas, from which point it will reach the present system at Matehuala. The country through which the road will pass is rich both in agricultural and mining products, and the line will have a large traffic from the beginning. Charles Thornton is the contractor. Felipe Muriedas is President, and Mr. Liebermann is Chief Engineer.

Vaudreuil & Prescott.—Rigaud, on the Ottawa River, about 15 miles west of Vaudreuil, is now the terminus of the grading, and work is going rapidly forward toward Ottawa, the western terminus. The company has made arrangements for the connection with the Grand Trunk at Vaudreuil.

Wautauga Valley.—This company has been chartered in Tennessee to construct a road from a point at or near Johnson City, Tenn., through Elizabethton, and thence by the most practicable route to the line between

Tennessee and North Carolina, in the counties of Carter and Johnson, near where the Wautauga River crosses.

Westerly & Jewett City.—The preliminary surveys have been completed for this road, referred to Aug. 23, on page 563, as the Jewett City & Westerly. The line is to extend from Westerly, R. I., to Jewett City, Conn., passing through Voluntown, Conn., and will be about 25 miles long. H. E. Chamberlain, of Westerly, is the Chairman, and Thomas E. Chappell, of Pawtucket, is Chief Engineer.

White Water Valley.—This company has been formally consolidated with the Fort Wayne, Cincinnati & Louisville. It extends from Harrison, Ind., to Hagers-town, Ind., 65 miles, and has been operated by the officers of the Fort Wayne, Cincinnati & Louisville, with which it connects at Cambridge City. It is stated that a new road will be built from Harrison to Cincinnati.

Woodville & Southern.—This company has been incorporated in Wisconsin to build a road from Woodville, St. Croix County, to Wildwood, in the same county, a distance of 10 miles.

TRAFFIC.

Traffic Notes.

The Boston & Albany and the Fitchburg have come to an agreement upon Western passenger rates, and the regular tariff will be restored November 10th. The regular rates have been cut about \$2 for several months.

The rate on grain and flour from Minneapolis to all Eastern points is to be advanced 2½ cents on Nov. 15, and it is said that all the roads have agreed to the advance.

The shipment of 4,530 bales of cotton out of Memphis by the Louisville, New Orleans & Texas, Oct. 21, was the largest of the season, but not the largest on record. The Chesapeake, Ohio & Southwestern took out 6,175 bales on Nov. 20, 1888.

On the Mallory steamship line from New York to Galveston three steamers loaded to full capacity leave New York every week. The demand for freight room is greater than ever before, owing to the prosperous condition of things in Texas.

The Texas & Pacific has made a rate of 25 cents per 100 lbs. on all descriptions of merchandise, regardless of classification, from New Orleans to Shreveport. This is said to be on account of a rate of 25 cents that is being made to Shreveport via the Morgan & Red River and coast steamer lines.

The Railroad Commission of Mississippi, after hearing the request of Jackson and Meridian that the Vicksburg & Meridian be required to restore the freight rate fixed by the Commission some time since, and increased by the road without the consent of the Commission, made an order restoring the old rate.

The differential of \$1 allowed the Cleveland, Cincinnati, Chicago & St. Louis and the Wabash on eastbound passenger business has been abolished. President Ingalls of the C., C. & St. L., President McKean of the Vandalia, President Barnard of the Ohio & Mississippi, and President Hays of the Wabash having agreed upon the matter last week.

The Occidental & Oriental and the Pacific Mail Steamship Companies, which jointly do the business between California and China, will hereafter keep only six steamers in service, two being withdrawn. The "City of New York" and the "City of Sydney" will be placed on the Panama line, which will increase that service from two to three steamers a month.

The contract between the Chicago & Northwestern and the Union Pacific, briefly referred to last week, will go into operation on Nov. 1 for the period of 10 years. It is not an exclusive contract on either side. The Union Pacific is at liberty to make similar agreements with other Eastern connections, and the C. & N. W. can exchange business with other transcontinental lines as usual. In addition to the main parties, it includes several minor roads controlled by the Northwestern, including the Chicago, St. Paul, Minneapolis & Omaha, which has a line from Sioux City to Duluth, 451 miles long, 67 miles shorter than the distance from Sioux City to Chicago. The line will be known as the Chicago, Union Pacific & Northwestern line. No other common carrier is to have better rates than are to be given by the companies to each other, and the C. & N. W. has made no agreement not to extend its Western lines, although it has no intention of doing so at present. That company is in no way interested in the reported extensions of the Union Pacific toward Los Angeles or to any point on the Southern Pacific coast.

An Extensive Plan for Through Billing. The Western Freight, Central Traffic and Trunk Line Associations have agreed to a system of through billing everywhere in the territories of the three associations. It is expected this to prevent many of the forms of manipulation lately come to light. Details are yet to be arranged.

East-bound Shipments. The shipments of East-bound freight from Chicago by all lines for the week ending Saturday, Oct. 25, amounted to 70,165 tons, against 63,755 tons during the preceding week, an increase of 6,405 tons, and against 56,088 tons during the corresponding week of 1888, an increase of 4,011 tons. The proportions carried by each road were:

	Wk to Oct. 25.		Wk to Oct. 19.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	7,787	11.1	6,131	9.6
Wabash.....	4,586	6.6	4,353	6.8
Lake Shore & Michigan South.....	11,647	20.9	11,760	28.5
Pitts., Ft. Wayne & Chicago.....	7,508	10.7	7,571	11.9
Chicago, St. Louis & Pitts.....	8,703	12.4	8,814	13.8
Baltimore & Ohio.....	7,611	10.9	5,418	8.5
Chicago & Grand Trunk.....	7,185	10.3	7,436	11.7
New York, Chic. & St. Louis.....	3,839	5.5	4,362	6.8
Chicago & Atlantic.....	8,300	11.6	7,910	12.4
Total.....	70,166	100.0	63,755	100.0

Of the above shipments 2,881 tons were flour, 30,829 tons grain, 2,497 tons millstuffs, 5,000 tons cured meats, 2,625 tons lard, 9,611 tons dressed beef, 1,104 tons butter, 2,514 tons hides, 151 tons wool and 6,020 tons lumber. The three Vanderbilt lines together carried 37.5 per cent., while the two Pennsylvania lines carried 23.1 per cent.

Western Society of Engineers. The regular meeting was held at the society's rooms Oct. 2. Some 60 members were present. Mr. Cape Whitehouse read a paper on Irrigation in Egypt and the Rajah reservoir project.